CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Airline	15WG-2758B, 15WG-2759A, 25WG-2758B, Prod. Chg. Bul. 65	202-1
Coronado	25TV2-43-9022B Tel. Rec. Prod. Chg. Bul. 65	202-1
Crosley	D-25BE, CE, GN, MN, TN, WE (Ch. 311, 311-1)	202-2
Emerson	721D, 728D (Ch. 120166-D), 731D (Ch. 120167-D & Radio Ch. 120152-B), 736B (Ch. 120171-B) Tel. Rec., Prod. Chg. Bul. 65	202-1
Mopar	819, 820, 824	202-3
National	HRO-60	202-4
Philco	53-702, 53-706, 53-707	202-5
RCA Victor	21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B & Audio Ch. RS141C) Tel. Rec.	202-6
Raytheon	C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3) Tel. Rec.	202-7
Shaw	Ch. 224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2) Tel. Rec.	202-8
Tele King	RK51A	202-9
Westinghouse	H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21, H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5) Tel. Rec.	202-10

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 5 IN SET 197

	In later production of Emerson Models 721D and 728D (Ch. 120166-D) the following changes were made. Whenever applicable these changes may be made in the field on sets which were not changed in production. The vertical deflection coil connections were reversed. Terminal 6 was connected to pin 3 of the yoke plug and terminal 4 was connected to pin 2.
Chassis Coded △B	In order to make the setting of the Vertical Hold Control less critcial in fringe areas, R73 was changed from 100Ω to 150Ω in chassis coded Triangle B and up. NOTE: In sets incorporating this change vertical jitters might develop under certain noise "interference conditions". In this case the original 100Ω resistor will probably prove more satisfactory.
Chassis Coded △C	R94 was changed from 1KΩ to 820Ω in chassis coded Triangle C and up. This change was made to increase the stability of the horizontal multivibrator due to variations in 6SN7 tubes.
Chassis Coded △D	To reduce the amount of hiss and noise in fringe areas, C48 was changed from .001MFD to .002MFD in chassis coded triangle D and up.
Model 731D (Ch.120167-D & 120152-B)	Emerson Model 731D using TV Chassis 120167-D, Radio Chassis 120152-B, Record Changer part # 819068 and an electric clock has been added. Radio Ch. 120152-B is electrically similar to Ch. 120156-B used in Models 706B and 707B which are covered in Photofact Folder 5, Set 176. A common speaker is used for both radio and TV. For Service Information on the Record Changer refer to Photofact Folder 13, Set 107 or Record Changer Manual CM-3. TV Ch. 120167-D is electrically identical to Ch. 120166-D except for necessary switching circuits to accommodate the radio, phono and clock. A relay is included to switch the speaker from the TV to the Radio output. When the TV OFF/ON switch is turned on the relay is energized. This disconnects the 117 volts AC line to the radio and connects the speaker to the TV audio output transformer. When the switch is turned off and the relay is in the unenergized position, the radio audio output transformer is connected to the speaker and the power line is connected to the radio. A partial schematic showing the relay circuit is given in Fig. 1 on the reverse side. The speaker circuit is given in Fig. 2 on the reverse side. A TV-Phono switch is also included in Ch. 120167-D. This switch is connected between C48 and the top of the volume control (R1B). When in phono position the output of the Sound Discriminator (V10) is disconnected and the phono input is connected to the input of the AF Amp. (V11). B+ is, also, disconnected from the screen of the Horizonal Output Tube (V19), the plate of the damper (V20), and the plate and screen of the third Video IF Amp. (V5). A partial schematic showing the switching circuit is given in Fig. 3 on the reverse side.
Model 736B (Ch. 120171-B)	Emerson Model 736B (Ch. 120171-B) has also been added. This chassis is identical to Ch. 120166-D except for the following: Model 736B uses a 21MP4 picture tube. When the metal picture tube is used a 500MMF, 20,000 volt, capacitor (Part #923016) is added from pin 7 of V21 (1B3GT) to ground, and a 100KΩ, 1 watt resistor is added in series with the high voltage lead to the picture tube.

EMERSON MODELS 721D, 728D(Ch.120166-D) 731D (Ch.120167-D & Radio Ch.120152-B)736B (Ch.120171-B)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

(Continued on Page 3)

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

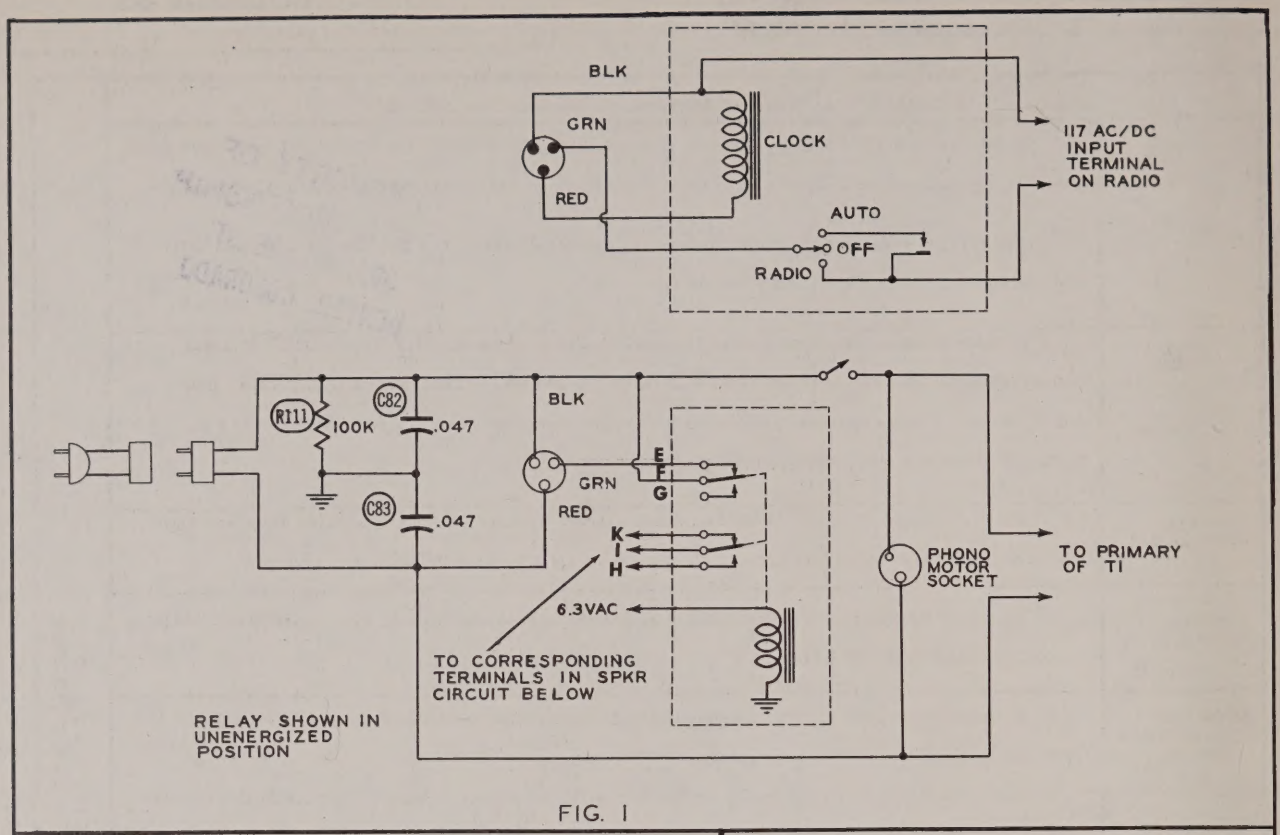


FIG. 1

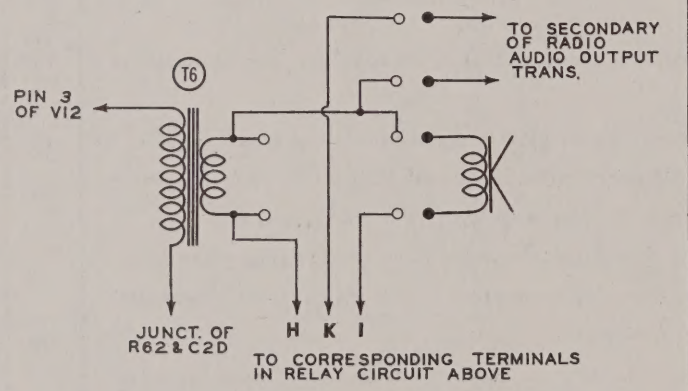


FIG. 2

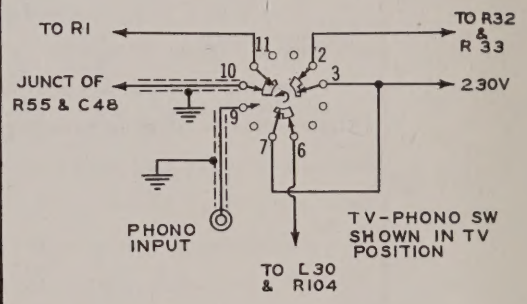


FIG. 3

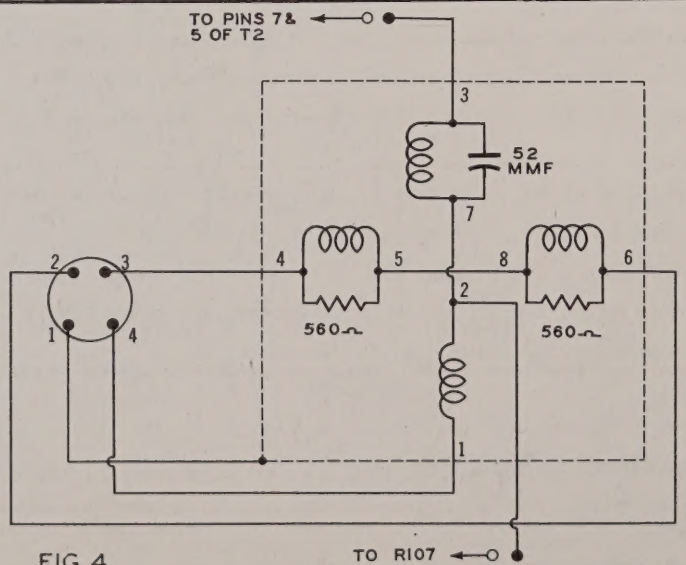


FIG. 4

A different tuner (part #470704) is used in Model 736B. This tuner is identical to the original, used in Ch. 120166-D (part #470688), except for lead length.

The deflection yoke connections were also reversed. A diagram is given in Fig. 4 on the preceding page, which shows the connections for Model 736B.

Original production (no code triangle) of Ch. 120171-B contained the production changes through triangle D for Ch. 120166-D.

PROPERTY OF
L.E. BLA[illegible]NSHIP
3924 [illegible] ST.
DENVE[illegible]LORADO

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 144

Models 15WG-2758B 15WG-2759A

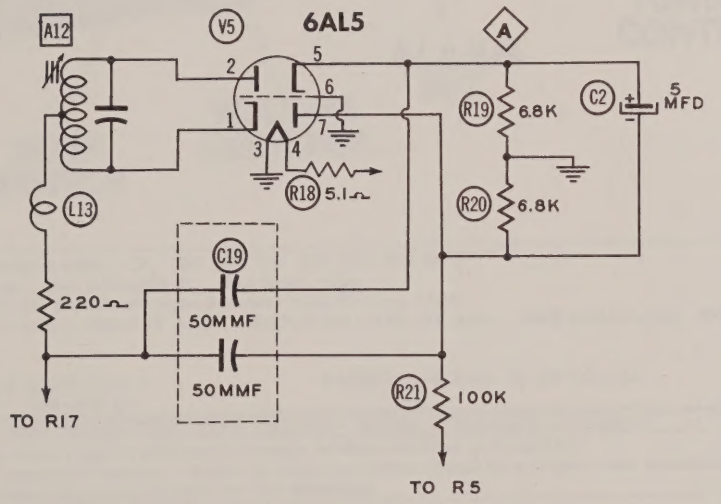
Airline Models 15WG-2758B and 15WG-2759A are electrically identical to Model 15WG-2758A covered in Photofact Folder 2, Set 144 except for the following:

The tone control, R1, was changed from 500KΩ to 1Meg.

The connection to terminals 11 and 12 of the switch (M5) used to switch B+ from the RF And IF sections when in phono position were omitted and the two points connected together so that B+ is supplied to the RF and IF sections at all times.

Model 25WG-2758B

Model 25WG-2758B is identical to Model 15WG-2758B above except C19 was replaced by a dual 50MMF capacitor. The added section of this capacitor is connected to pin 5 of V5. A 220Ω resistor was added in series between C19 and L13. A 1000MMF capacitor was also added, from pin 7 (Cathode) of the 2nd. FM IF Amplifier (V4), to ground. A partial schematic below shows the revised circuit.



SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET #183

Coronado Model 25TV2-43-9022B is identical to Model 25TV2-43-9022A covered in Photofact Folder 4 in Set 183 except for the following:

NEW PICTURE TUBE

Model 25TV2-43-9022B uses a 17HP4 picture tube instead of a 17TP4.

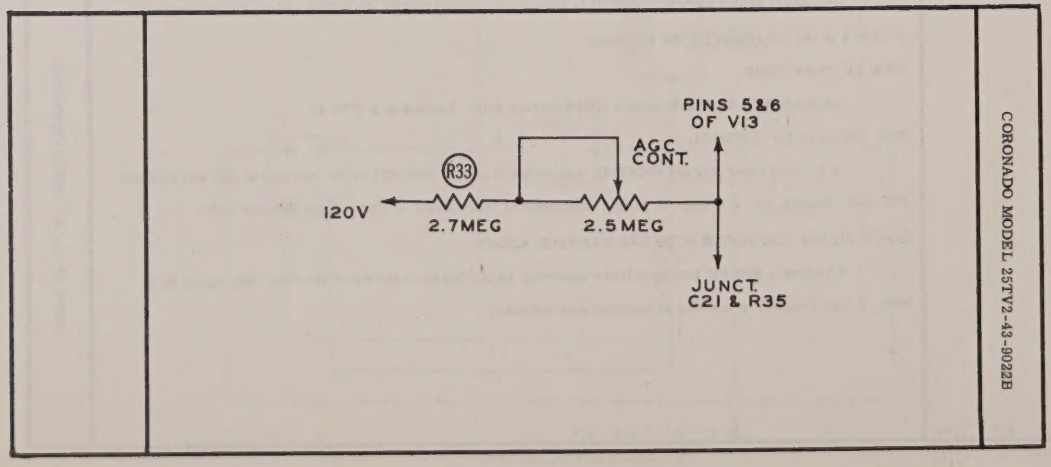
AGC THRESHOLD CONTROL

A 2.5Meg control (Part #40X364) was added in series with R33 to the junction of C21 and R35 and R33 was changed to 2.7Meg. A partial schematic of this circuit is given on the reverse side.

INPUT FILTER CAPACITOR BLEEDER RESISTOR ADDED

To allow a path for the input filter capacitor to discharge in the event the fuse, M1, opens up a 100K, 2 watt resistor was added in parallel with the fuse.

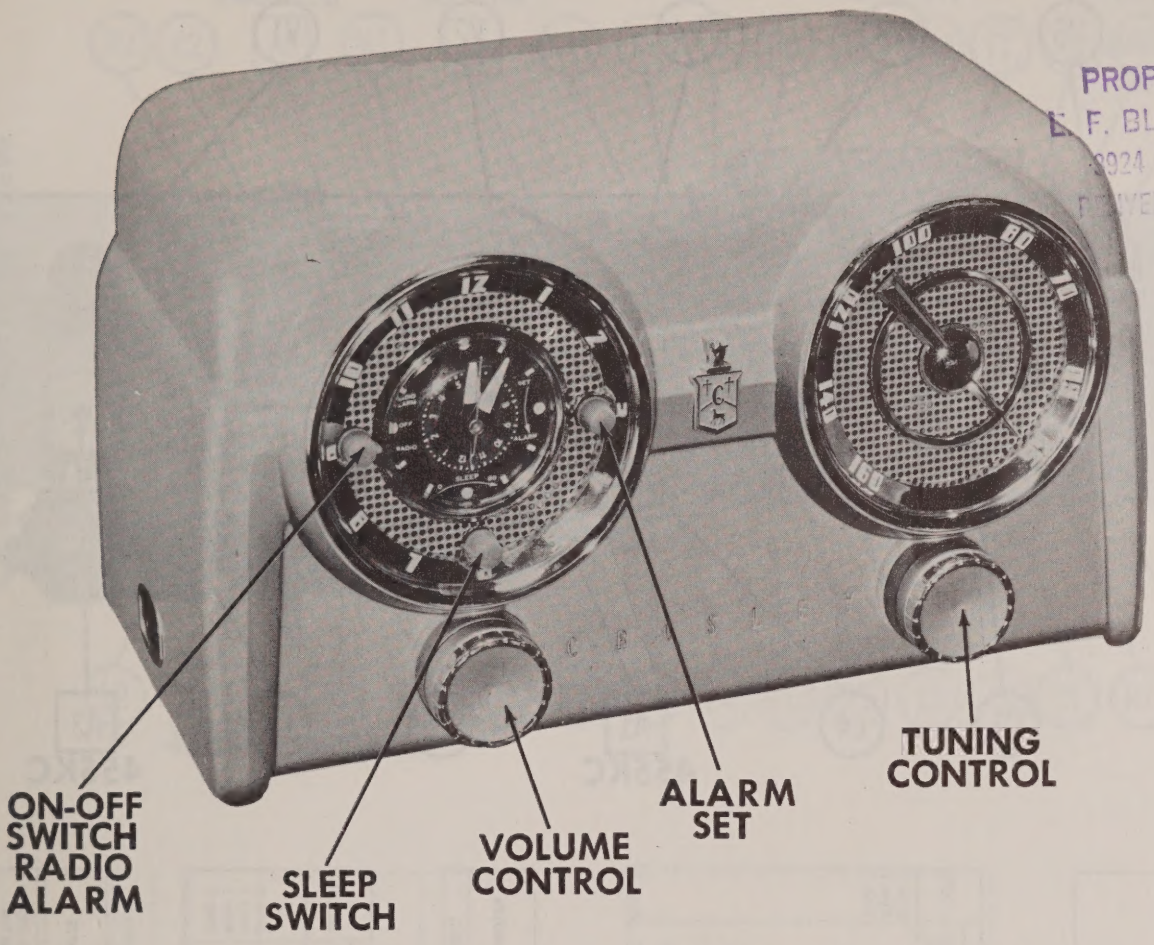
(Continued on Reverse Side)


PINS 5&6
OF V13
AGC
CONT.
R33
120V
2.7MEG
2.5MEG
JUNCT.
C21 & R35
CORONADO MODEL 25TV2-43-9022B

CROSLEY MODELS D-25BE, CE, GN, MN, TN, WE, (Ch. 311, 311-1)

PROPERTY OF
E. F. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

CROSLEY MODELS D-25BE, CE, GN, MN, TN, WE, (Ch. 311, 311-1)



CROSLEY MODELS D-25BE, CE, GN, MN, TN, WE, (Ch. 311, 311-1)

TRADE NAME	Crosley Models D-25BE, CE, GN, MN, TN, WE (Ch. 311, 311-1)
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12SQ7GT Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200MMF	High side to external antenna screw on loop. Low side to outer terminal of phono jack.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6	"
4.	Replace receiver and loop in cabinet and retouch A6 for maximum output at 1400KC. A6 is accessible through a hole in bottom of cabinet.						

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12SQ7GT	12SQ7GT	8Q	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTE
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■100	150	B-149541	AFH3-13		C0I0			R1307	Note 1
B	▲30	150				BR1015				Note 1
C	10	150								Note 1
C2	39		C-137727-109							
C3	.1	200	39001-19	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C4	.08	200	39001-85							
C5A	200		C-144675-1	SI200	D6-201	TM5T2	GP2K-201	UC-532	34C3	
B	.002			BPD-002	DD-202	TM5D2	801-002	DC-522		
C	200			SI200	D6-201	TM5T2	GP2K-201	UC-532		
D	.005			BPD-005	DD-502	TM5D5	811-005	DC-525		
C6	.0005	600	39001-5	P685-0005	D6-501	PTE6T5	GP2K-501	TP403	6TM-T5	
C7	100		B-143686-3	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C8	.0047	200	39477-39	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C9	.01	400	39477-41	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C10	.047	400	39477-45	489ZX-05		PJ4S47		PT4147	4TM-S47	
C11	.08	200	39001-85							
C12	.002	600	39001-74	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	Note 2

Note 1. Chassis 311-1 omits C1C and replaces C1A and C1B with dual 20MFD unit (Part #B-151017).
Note 2. Used with PM speaker only.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	3 Meg	½	B-149382					Volume Tap @ 300KΩ

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CROSLEY PART No.	IRC PART No.	
R2	22KΩ	½	39373-60	BTS-22K	
R3	2.2Meg	½	39373-97	BTS-2.2Meg	
R4	100KΩ	½	39373-74	BTS-100K	
R5	10 Meg	½	39373-107	BTS-10Meg	
R6	470KΩ	½	39373-87	BTS-470K	
R7	680KΩ	½	39373-90	BTS-680K	
R8	47KΩ	½	39373-67	BTS-47K	

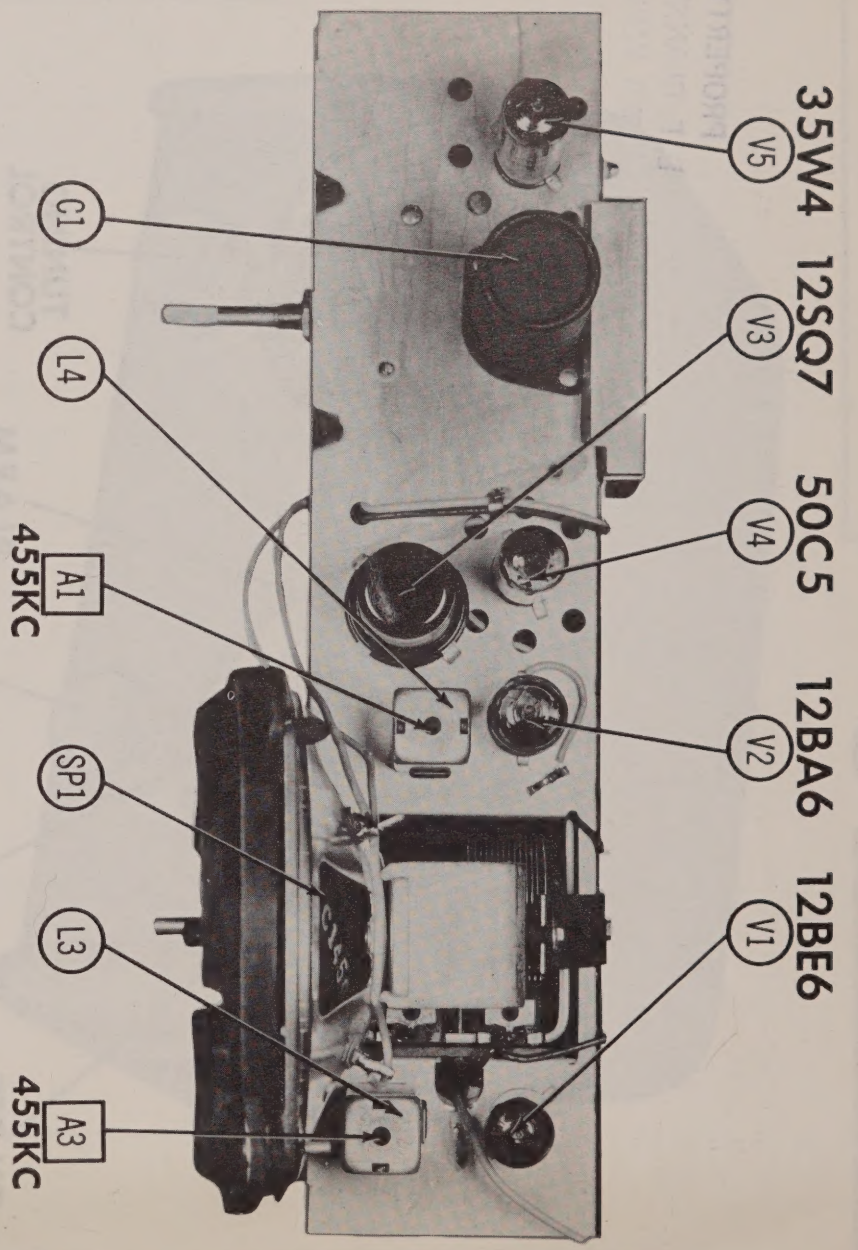
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CROSLEY PART No.	IRC PART No.	
R9	470KΩ	½	39373-87	BTS-470K	
R10	150Ω	½	39373-16	BTS-150	
R11	1000Ω	½	39373-33	BTS-1000	Note 2
R12	100Ω	2	39374-189		Note 1
R13	1200Ω	1	39374-114	BTA-1200	Note 2
R14	5600Ω	½	30374-34	BTS-5600	Note 3

Note 1. This resistor is changed to 10Ω in Ch. 311-1 (part #39373-1)
Note 2. Not used in Ch. 311-1 which employs EM speaker.
Note 3. Used only in Ch. 311. (PM speaker).

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2.8KΩ	3.9Ω	370Ω	.8Ω	B-147171	A-3876	A-3025 ①	RO-302	S-1X	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5 1/4"	PM	3.9Ω	AD-145956-2 AD-151190-2 ①	ST-803 Mod. P525-V	52A1	① 5 1/4" EM speaker 680Ω field. Used in Ch. 311-1.

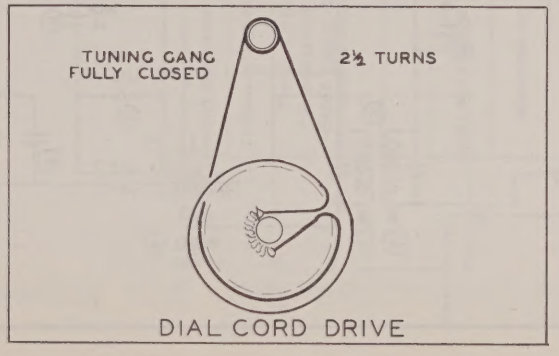
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	CROSLEY PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Loop Ant.	.1Ω	2.4Ω	AC-149557			Includes cabinet back
L2	Osc. Coil	.8Ω	4.5Ω	AW-148259	71-OSC *	14-1040 *	
L3	Input IF	14.5Ω	15Ω	AC-139919-3	12-C1	16-6758	
L4	Output IF	14.5Ω	15Ω	AC-139919-3	12-C2	16-6758	

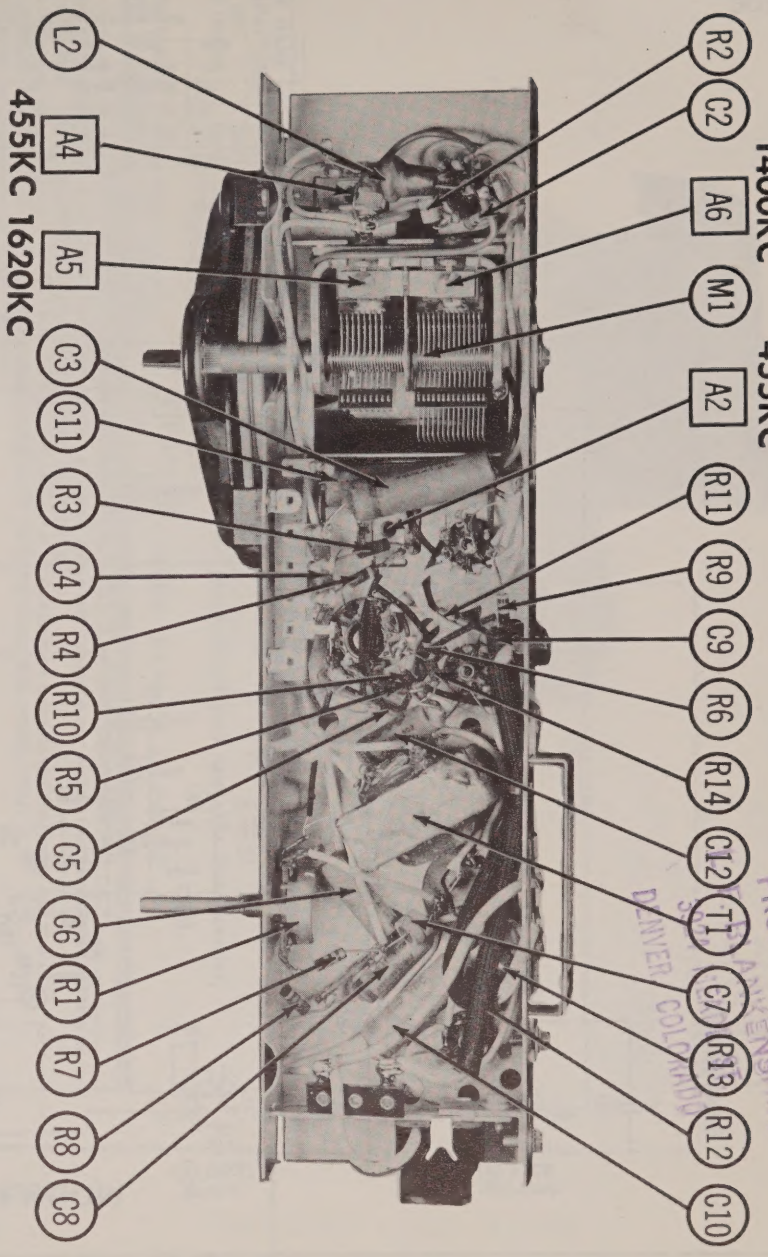
* Drill mounting hole.

MISCELLANEOUS

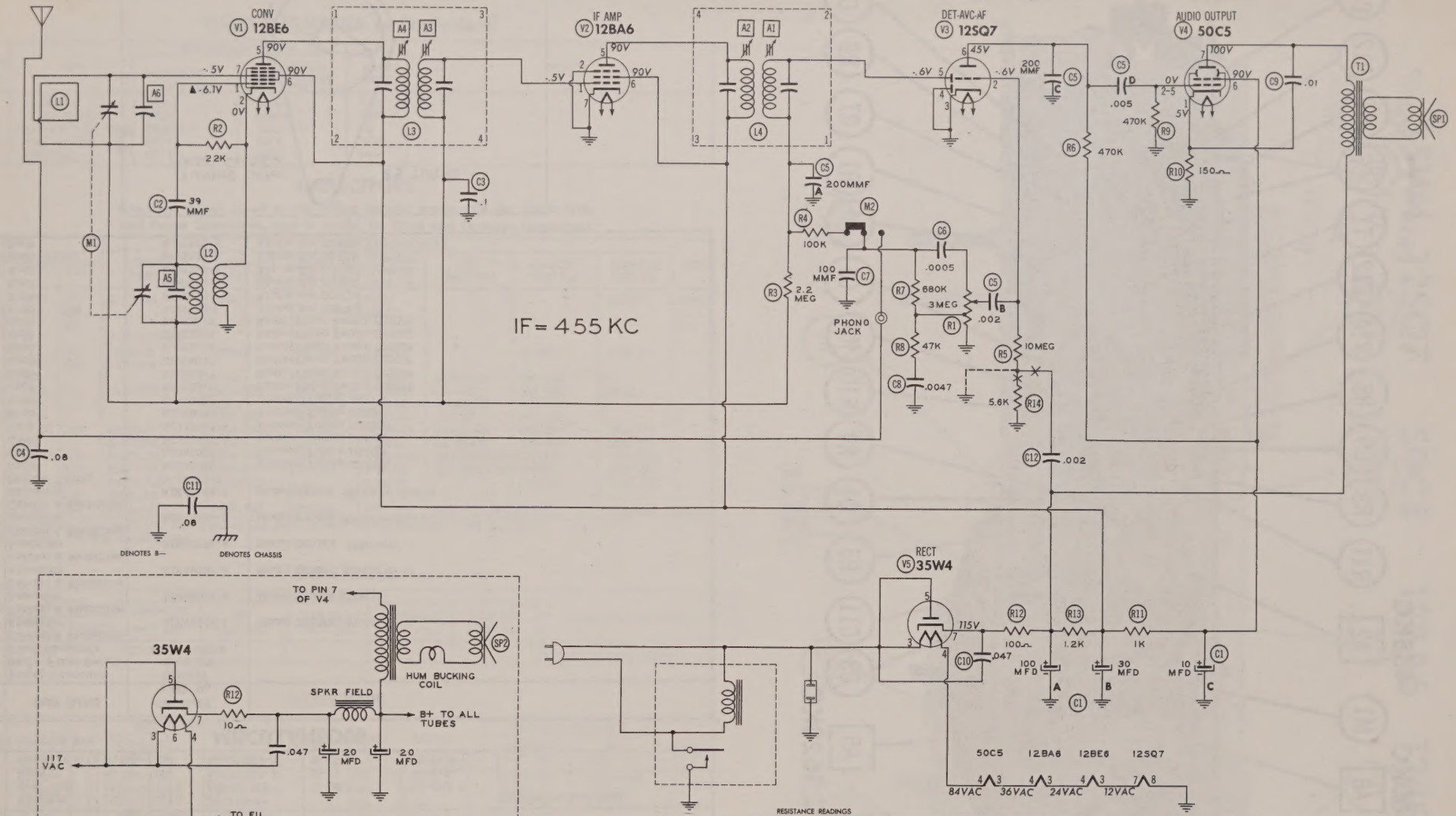
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M1	Tuning Capacitor	B149437	
M2	Radio-Phono Switch	W-148260	
	Clock Assembly	AW-149689	
	Cabinet & Medallion Assembly	AD149598-1	Model D25WE (White)
	Cabinet & Medallion Assembly	AD149598-9	Model D25TN (Tan)
	Cabinet & Medallion Assembly	AD149598-3	Model D25CE (Chartreuse)
	Cabinet & Medallion Assembly	AD149598-4	Model D25MN (Maroon)
	Cabinet & Medallion Assembly	AD149598-8	Model D25BE (Metallic Blue)
	Cabinet & Medallion Assembly	AD149598-7	Model D25GN (Metallic Green)
	Pointer Tuning	C-149621-1	
	Knob	AC149952-1	Volume-Tuning D25WE
	Knob	AC149952-7	Volume-Tuning D25GN
	Knob	AC149952-3	Volume-Tuning D25CE
	Knob	AC149952-4	Volume-Tuning D25MN
	Knob	AC149952-8	Volume-Tuning D25BE
	Knob	AC149952-9	Volume-Tuning D25TN
	Knob	B149311-1	Radio-Phono Switch D25WE
	Knob	B149311-7	Radio-Phono Switch D25GN
	Knob	B149311-3	Radio-Phono Switch D25CE
	Knob	B149311-4	Radio-Phono Switch D25MN
	Knob	B149311-8	Radio-Phono Switch D25BE
	Knob	B149311-9	Radio-Phono Switch D25TN
	Knob	B149339-1	Alarm-Set D25WE
	Knob	B149339-7	Alarm-Set D25GN
	Knob	B149339-3	Alarm-Set D25CE
	Knob	B149339-4	Alarm-Set D25MN
	Knob	B149339-8	Alarm-Set D25BE
	Knob	B149339-9	Alarm-Set D25TN



CHASSIS—BOTTOM VIEW



PROPERTY OF
DENVER COLORADO



ALTERNATE POWER SUPPLY CIRCUIT USED ON CHASSIS 311-1

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BE6	22KΩ	.8Ω	12Ω	24Ω	†1.2KΩ	†1.2KΩ	3.3Meg	
V 2	12BA6	3.3Meg	0Ω	24Ω	36Ω	†1.2KΩ	†1.2KΩ	0Ω	
V 3	12SQ7	0Ω	10 Meg	0Ω	0Ω	†1 Meg	†470KΩ	12Ω	0Ω
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†2.2KΩ	†470Ω	
V 5	35W4	INF	INF	85Ω	72Ω	85Ω	80Ω	300KΩ	

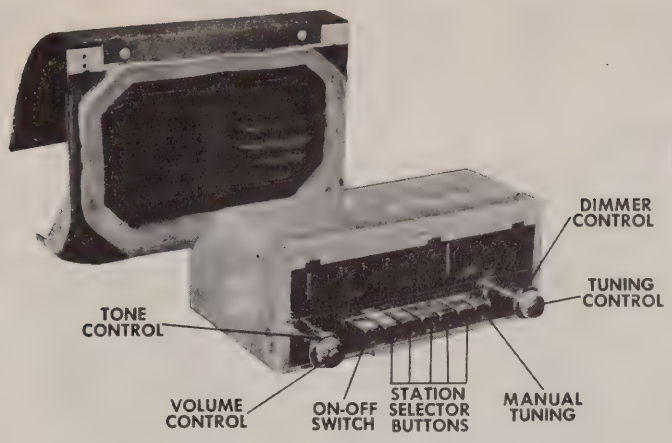
▲ TAKEN WITH VACUUM TUBE VOLTMETER
ALL MEASUREMENTS TAKEN WITH SWITCH IN RADIO POSITION
† MEASURED FROM PIN 7 OF V5

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

202-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



MOPAR MODEL 824

TRADE NAME	Mopar Models 819 (Plymouth), 820 (Dodge), 824(Chrysler)(1953 Automobile).
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pennsylvania
TYPE SET	Battery Operated AM Automiblle Superheterodyne Receiver
TUBES (Eight)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det-AVC-AF Amp., 6C4 Phase Inverter, (2) 6AQ5 Audio Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery RATING 8.1 Amp @ 6.3 Volts DC
TUNING RANGE—BROADCAST	535-1605KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn tuning control maximum counter clockwise and set pointer to last reference mark at low frequency end of dial.
During Step 1 remove dial to gain access to bottom slugs of IF Transformers, then replace dial.
Housing must be in place during Steps 3 thru 8.
Set tone control to MUSIC position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~Mod)	Low frequency end of dial.	Across voice coil.	A1, A2, A3, A4	Depress any station selector button. Adjust for maximum output.
2.	Fig. 1	High side to antenna receptacle. Low side to chassis.	455KC	Any	"	A5	Depress any station selector button. Adjust for MINIMUM output.
3.	"	"	1605KC	1605	"	A6	Depress amanual push button. Tune pointer to 1605. Adjust for maximum output.
4.	"	"	1400KC	1400	"	A7, A8	Tune to 1400. Adjust for maximum output.
5.	"	"	580KC	Tune to 580KC signal.	"	A9	Adjust for maximum output while rocking tuning control.
6.	Repeat steps 3 and 4.						
7.	If considerable adjustment was necessary in step 6 repeat steps 5, 3 and 4 in that order.						
8.	Fig. 1	High side to antenna receptacle. Low side to chassis.	1200KC	Depress push button #6.	Across voice coil.	A10	Set push button #6 for 1200KC reception (See push button adjustments). Adjust A10 for maximum output.
9.	With radio installed in car and antenna extended tune manually to a weak signal near 1400KC and adjust A8 for maximum output.						
10.	With radio installed in car and antenna extendes set push button #6 for a station near 1200KC and adjust A10 for maximum output.						

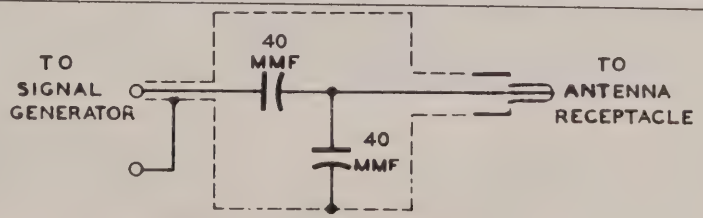


FIG. 1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

MOPAR MODELS 819, 820, 824

MOPAR MODELS 819, 820, 824

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det.-AVC-AF Amp	6AV6	6AV6	7BT	
V5	Phase Inverter	6C4	6C4	6BG	
V6	Audio Output	6AQ5	6AQ5	6BZ	
V7	Audio Output	6AQ5	6AQ5	7BZ	
V8	Rectifier	6X4	6X4	7BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTE
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	350	61-0086	AFH3-106		CO78		FP343.1	TVL-3634	
B	▲10	350								
C	20	25								
C2	.047	400	30-4650-62	P488-047	DF-503	PTE4S47		4TM-S47	4TM-S47	
C3	39	500	60-00395417	1469-00004		5R5Q4			MS-44	
C4	56	500	60-00565417							
C5	.047	200	45-3505-28	P288-047	DF-503	PJ2S5		PT4147	2TM-S47	
C6	10	500	60-00105407	1469-00001		5R5Q1			MS-41	
C7	.047	200	45-3505-28	P288-047	DF-503	PJ2S5		PT4147	2TM-S47	
C8	65		30-1224-87							
C9	.0047	400	45-3505-56	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C10	100	500	60-10105407	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C11	.01	400	45-3505-41	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C12	.1	200	45-3505-30	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C13	.25	100	61-0125	P185-25		MP2P25			2TM-P25	
C14	.0047	400	45-3505-56	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C15	.01	400	45-3505-41	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C16	.01	400	45-3505-41	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C17	.0068	1000	45-3505-91	P1088-0068		PTE16D68			MB-D68	
C18	.0068	1600		P1688-0068		PTE16D68			MB-D68	Note 1
C19	330		62-133001001	SI330	D6-331		GP2K-331	UC-5333	5GA-T33	
C20	.5	100	61-0137	P185-5		MP2P5			68P20	
C21	.5	120		P185-5		MP2P5			68P20	Note 2

Note 1. Some Models use .0047MFD in this application (Part #30-4661-1).
Note 2. Not used in all Models.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHILCO PART No.	IRC PART No.	
R3	120Ω	1/2	66-1128340	BTS-120	
R4	330Ω	1/2	66-1338340	BTS-330	
R5	10KΩ	1/2	66-3108340	BTS-10K	
R6	68KΩ	1/2	66-3688340	BTS-68K	
R7	22KΩ	1/2	66-3228340	BTS-22K	
R8	1 Meg	1/2	66-5108340	BTS-1 Meg	
R9	330Ω	1/2	66-1338340	BTS-330	
R10	27KΩ	1	66-3274340	BTA-27K	
R11	22KΩ	1/2	66-3228340	BTS-22K	
R12	180Ω	1/2	66-1188340	BTS-180	
R13	15 Meg	1/2	66-6158340	BTS-15Meg	

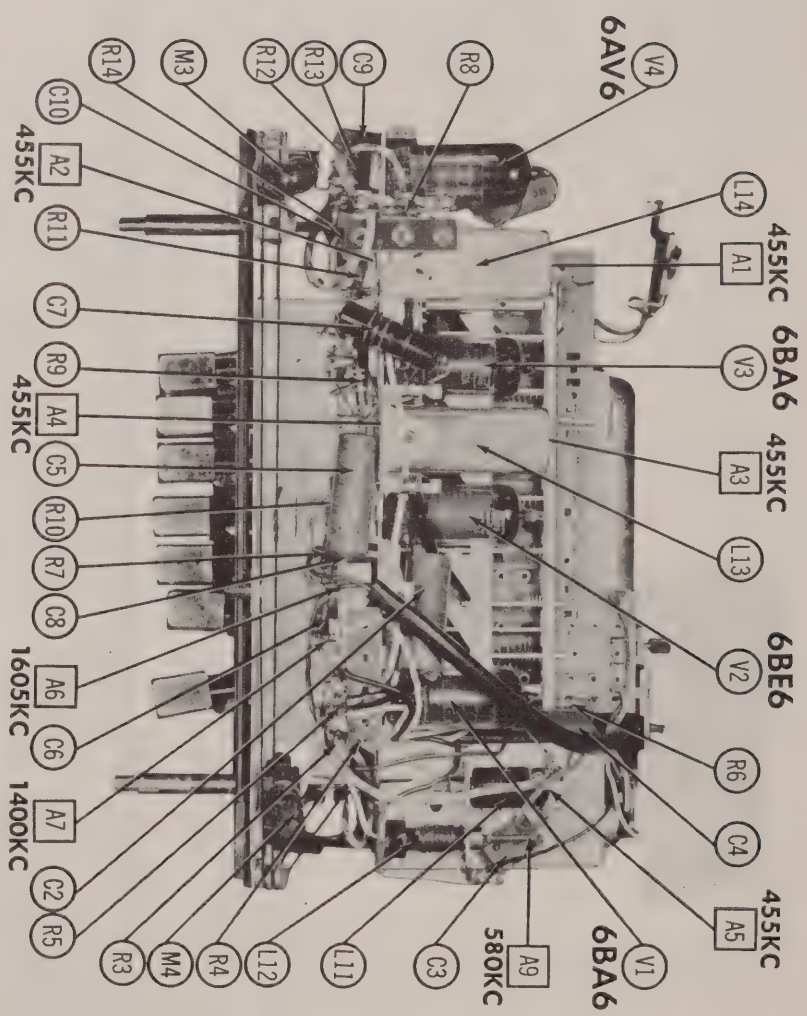
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHILCO PART No.	IRC PART No.	
R14	220KΩ	1/2	66-4228340	BTS-220K	
R15	15 Meg	1/2	66-6158340	BTS-15Meg	
R16	220KΩ	1/2	66-4228340	BTS-220K	
R17	220KΩ	1/2	66-4228340	BTS-220K	
R18	2200Ω	1/2	66-2228340	BTS-2200	
R19	470KΩ	1/2	66-4478340	BTS-470K	
R20	330Ω	1	66-1334340	BTA-330	
R21	470KΩ	1/2	66-4478340	BTS-470K	
R22	1000Ω	1	66-2104340	BTA-1000	
R23	100Ω	1	66-1104340	BTA-100	
R24	100Ω	1	66-1104340	BTA-100	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	*	1/2	33-5557-13	QJ-433A †				Tone-Panel - Note 1.
B	350KΩ	1/2						Volume-Rear
R2	15Ω	2	33-5568-1					Dimmer-Wire Wound-Note 2

* This control open in center-2 Meg each side of center.
Note 1. Model No. 819 uses alternate control part No. 33-5557-11. Model No. 820 uses alternate control part No. 33-5557-12.
Note 2. Model No. 819 uses alternate control part No. 33-5568-2. Model No. 820 uses alternate control part No. 33-5568-3.
† CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B12-141 & P1-229 (Panel) B18-132X & R1-308 (Rear).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	6.3VCT @4.1A	560VCT .057ADC			32-8318-2	P-6472 ①	P-3068 ①		V-18X

① Fabricate mounting.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2		3.2Ω	446Ω CT	.34Ω	32-8316-7		A-2900 ①		S-7X ①	

① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6 X 9	PM	3.2Ω	36-1631-2	ST-810 P69-V	69A2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PHILCO PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	
L1	RF Choke	4Ω		32-4422-24	4610		CL-1	5.6 Microheneries
L2	Ant. Coil	11.5Ω		312-5129				Manual Tuning
L3	RF Coil	12Ω		312-5129-1				Manual Tuning
L4	Osc. Coil	2.9Ω		312-5131				Manual Tuning
L5	Ant. Coil Assembly			76-4602-1				Push button tuning
L6	Osc. Coil	4.2Ω		32-4179-5				Push button tuning
L7	Osc. Coil	3Ω		32-4179-6				Push button tuning
L8	Osc. Coil	2.6Ω		32-4179-7				Push button tuning
L9	Osc. Coil	1.6Ω		32-4179-8				Push button tuning
L10	Osc. Coil	1.6Ω		32-4179-9				Push button tuning
L11 A	RF Coil	18.5Ω		32-4510				Push button tuning
B	IF Trap	29Ω						Part of L11A
L12	Osc. Shunt Coil	5Ω		32-4110-5				Tap @ .8Ω
L13	Input IF	12Ω	12Ω	32-4160A	12-C1	16-6758		
L14	Output IF	14.5Ω	14.5	32-4240A	12-C6	16-6770		
L15	Fil. Line Ch Choke	0Ω		32-1644	5221			
L16	Vibrator Hash Choke	.15Ω		32-4170-4				

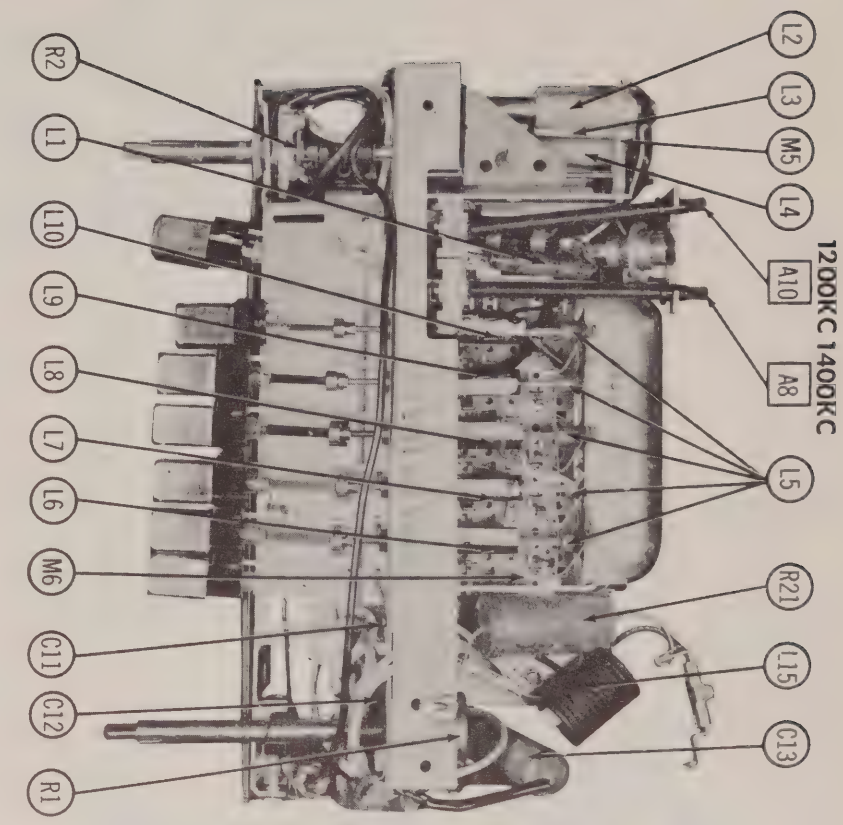
VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				PHILCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Int.	6.3V	115	45-6711	5326			

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A 32V	45-2559		307014 (SFE-14A)	157014	SFE-14	HD1

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PHILCO PART No.		NOTES
M3	Bayonet	6-8	.25	Blue	34-2064		Type #44
M4	Bayonet	6-8	.25	Blue	34-2064		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M5A	Tuning Unit Assy.	76-6634-1	Model C-5209
B	Tuning Unit Assy.	76-6634-2	Model D-5207 Includes L2, L3 and L4
C	Tuning Unit Assy.	76-6634-3	Model P-5206
M6	Switch Assembly	42-1956	Station Selector
M7	Capacitor Assembly	31-6522-2	
	Housing Assembly	76-8164	Control unit, Model P-5206
	Housing Assembly	76-8164FA3	Control Unit, Model D-5207
	Housing Assembly	76-6680	Control Unit, Model C-5209 (Includes bracket and rivet assy.)
	Bezel	76-7895	Model P-5206 (Includes bushing assy.)
	Bezel	76-7914	Model D-5207 (Includes bushing assy.)
	Bezel	56-8934	Model C-5209
	Frame	56-9956	Push Button Assy, Model P-5206
	Escutcheon	56-8938FA8	Push Button, Model C-5209
	Scale (Dial)	54-5157	Model P-5206
	Scale	54-5158	Model D-5207
	Scale	76-6656-3	Model C-5209 (Includes background and plate).
	Background Plate	56-9953-1	Model P-5206
	Background Plate	56-9938	Model D-5207
	Pointer	56-8906	Model P-5206
	Pointer	56-8906-1	Model D-5207
	Pointer	56-8935	Model C-5209
	Window	54-8774	Model P-5206 (Glass)
	Window	54-8370	Model C-5209 (Plastic)
	Bezel Overlay	54-8769	Model D-5207
	Knob Assembly	27-4687-19	(2) Volume and Tuning, Models P-5206 and D-5207
	Knob Assembly	27-4687-9	(2) Volume and Tuning, Model C-5209
	Knob Assembly	57-1682-1FA3	(2) Tone and Dimmer, Model P-5206
	Knob Assembly	57-1682-4FA8	(2) Tone and Dimmer, Model D-5207
	Knob Assembly	57-1682-7FA8	(2) Tone and Dimmer, Model C-5209

PUSH BUTTON ADJUSTMENTS

Tuning Range of Buttons

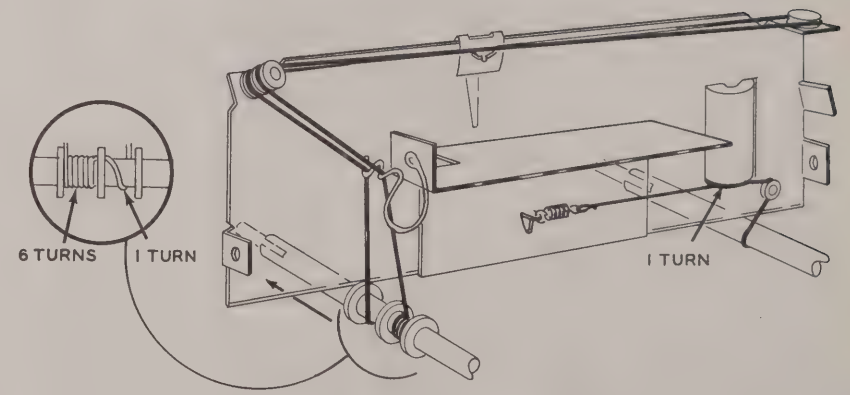
PB2	-	530-1020KC
PB3	-	610-1200KC
PB4	-	700-1410KC
PB5	-	740-1480KC
PB6	-	840-1605KC

Tuning adjustment of the push button is accessible by pulling off the metal covering of the button, exposing a knurled plastic thumb screw.

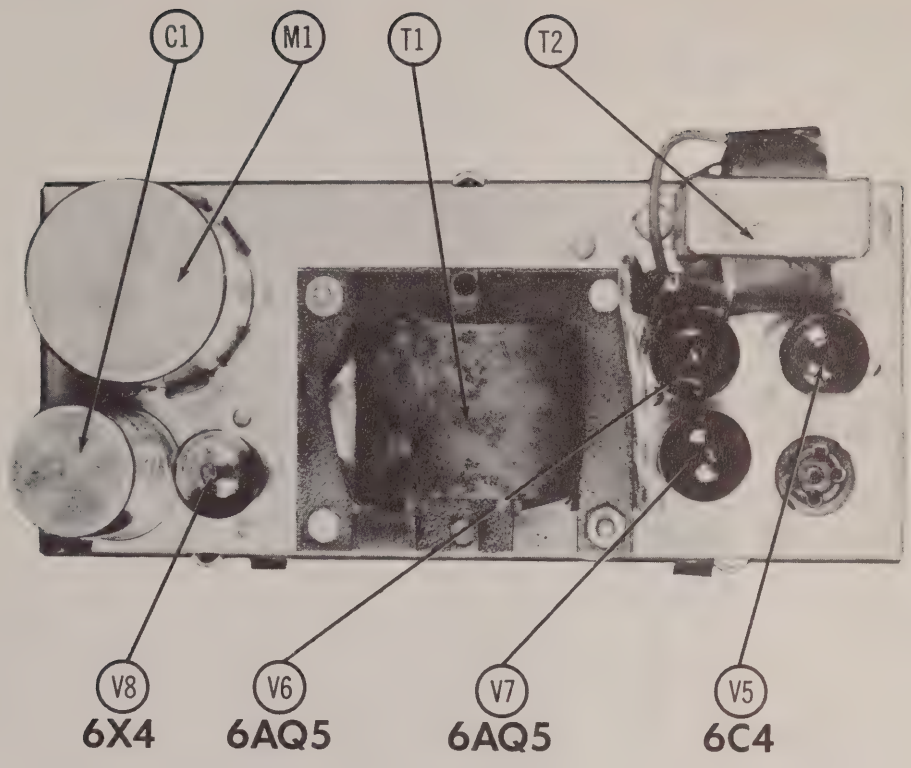
Select a station within tuning range of the button, depress the button and turn thumb screw until station is correctly tuned.

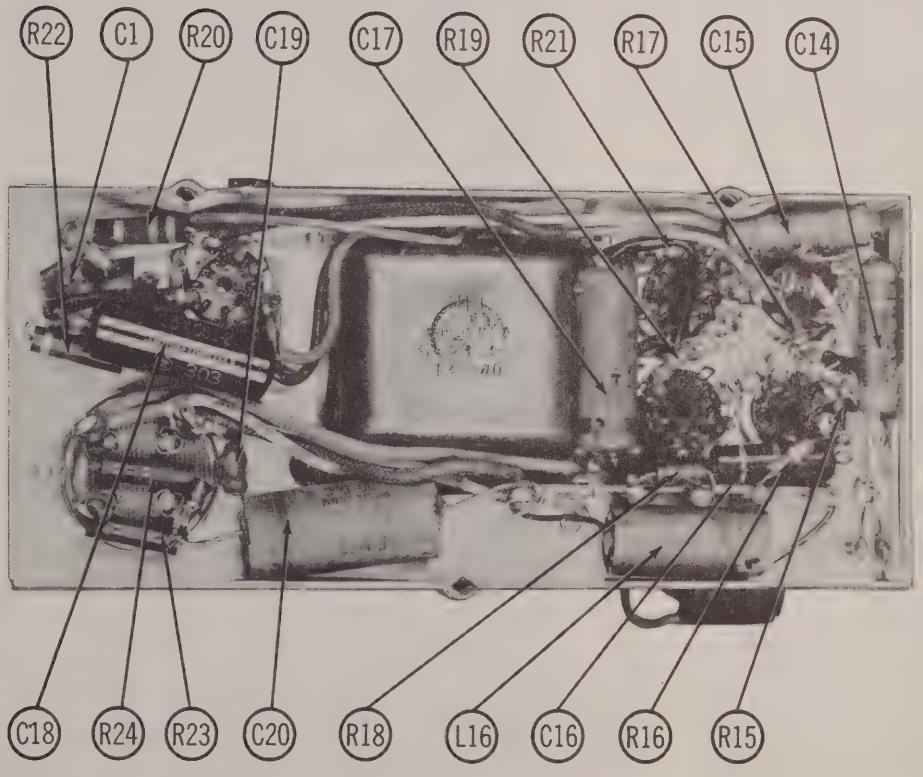
Repeat procedure with the 4 remaining buttons.

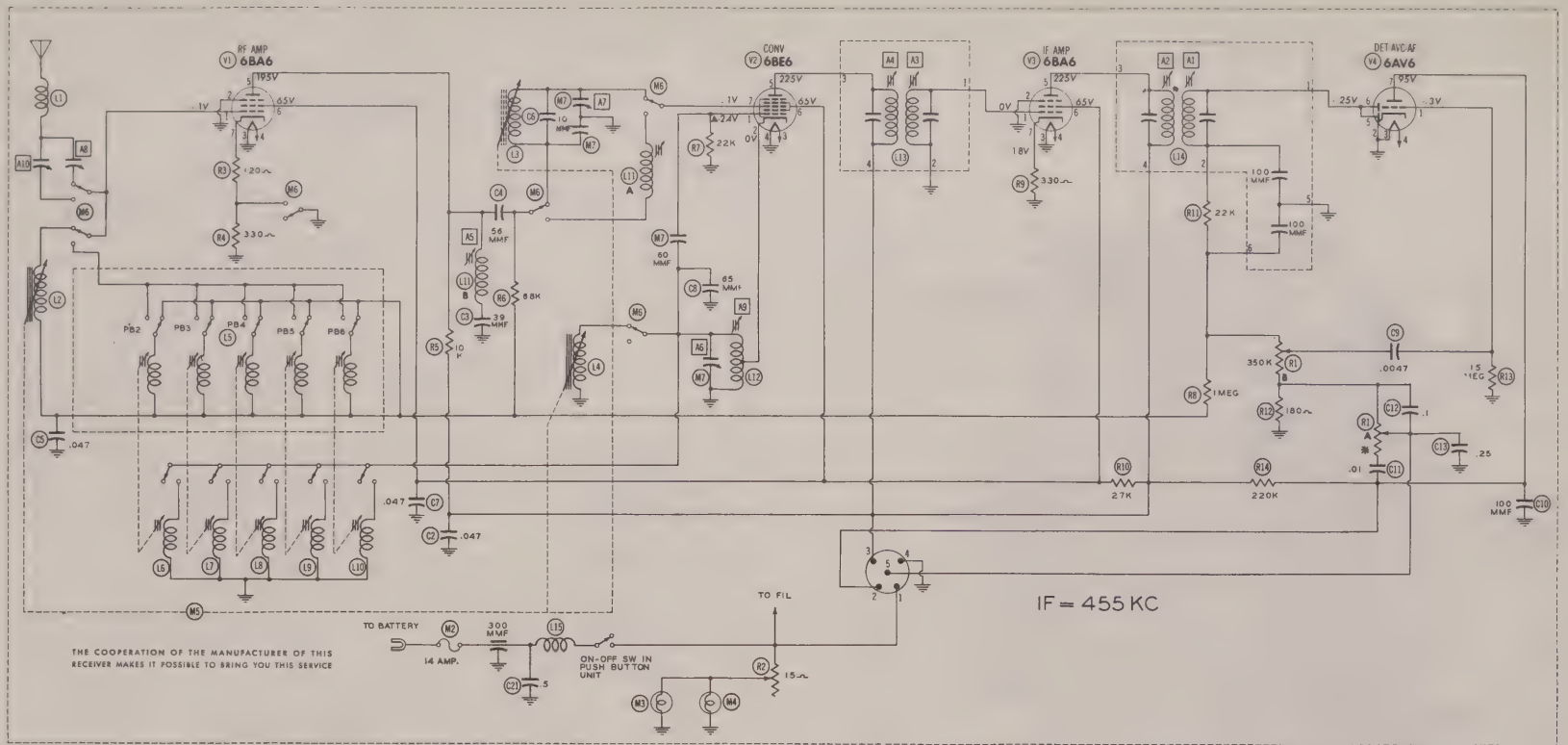
If desired, buttons may be set using a signal from a generator fed through dummy antenna to the receiver antenna receptacle.

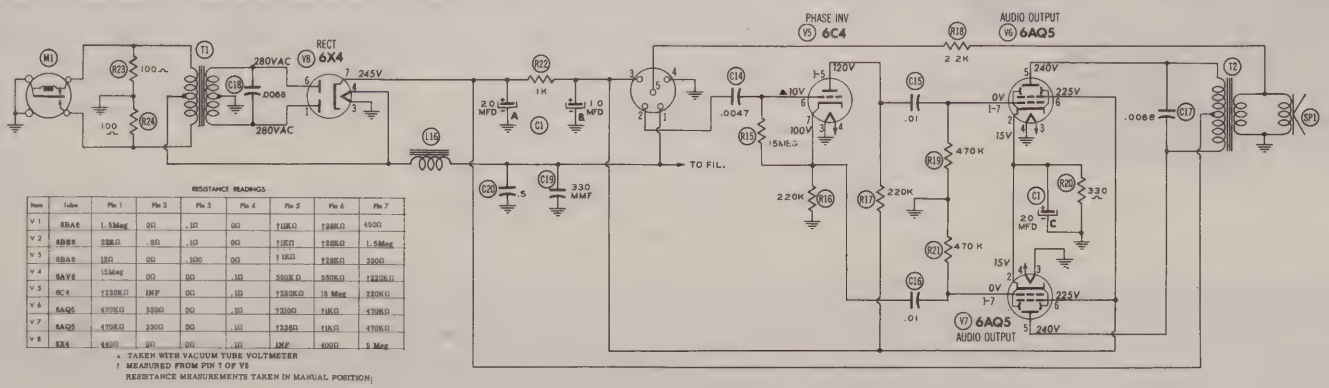


DIAL CORD DRIVE


C1
M1
T1
T2
V8
6X4
V6
6AQ5
V7
6AQ5
V5
6C4


R22
C1
R20
C19
C17
R19
R21
R17
C15
C14
C18
R24
R23
C20
R18
L16
C16
R16
R15


RF AMP V1 6BA6
CONV V2 6BE6
IF AMP V3 6BA6
DET AVC AF V4 6AV6
IF = 455 KC
TO BATTERY
14 AMP.
ON-OFF SW IN PUSH BUTTON UNIT
TO FIL.
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	1.5Meg	0Ω	.1Ω	0Ω	†1MΩ	†28KΩ	450Ω
V 2	6BE6	22KΩ	.8Ω	.1Ω	0Ω	†1KΩ	†28KΩ	1.5Meg
V 3	6BA6	12Ω	0Ω	.1Ω	0Ω	†1KΩ	†28KΩ	330Ω
V 4	6AV6	1.5Meg	0Ω	0Ω	.1Ω	560KΩ	560KΩ	†220KΩ
V 3	6C4	†230KΩ	INF	0Ω	.1Ω	†230KΩ	1.5 Meg	220KΩ
V 6	6AQ5	470KΩ	230Ω	0Ω	.1Ω	†210Ω	†1KΩ	470KΩ
V 7	6AQ5	470KΩ	230Ω	0Ω	.1Ω	†230Ω	†1KΩ	470KΩ
V 8	6X4	440Ω	0Ω	0Ω	.1Ω	INF	400Ω	2 Meg

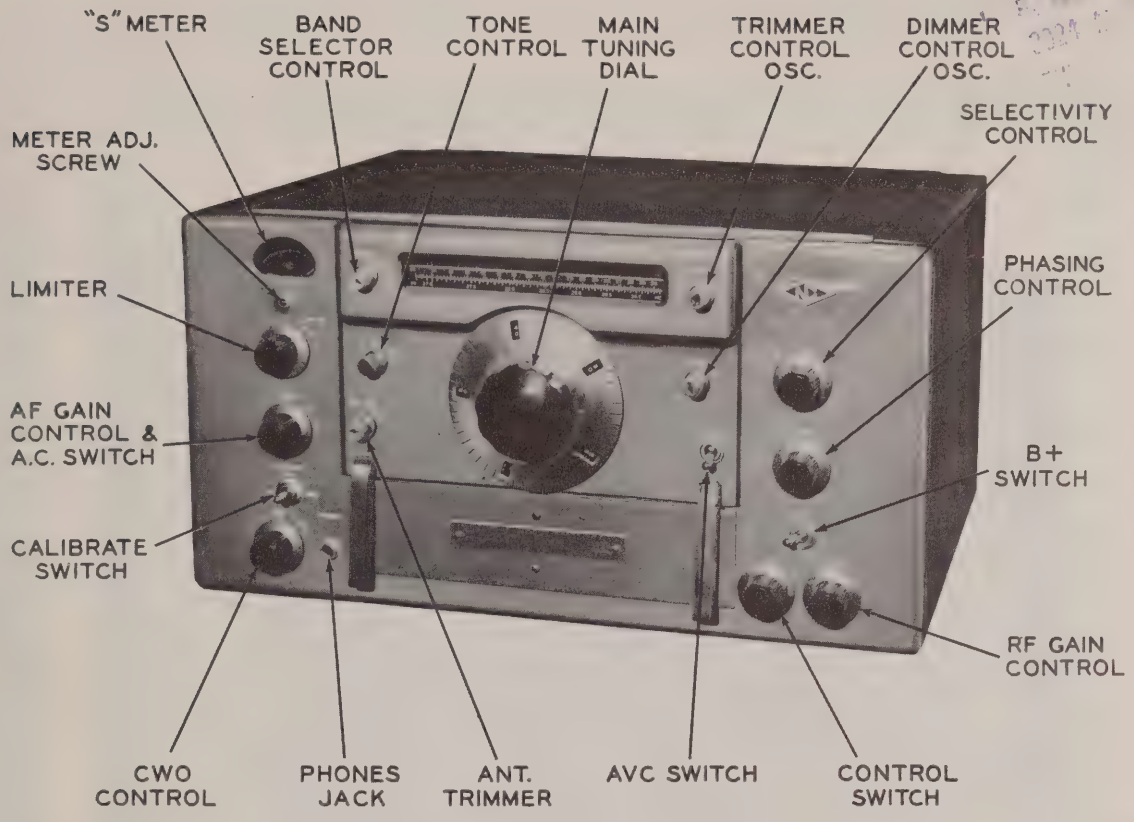
▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V8
RESISTANCE MEASUREMENTS TAKEN IN MANUAL POSITION;

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a vairation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

PROPERTY OF



NATIONAL
MODEL HRO-60

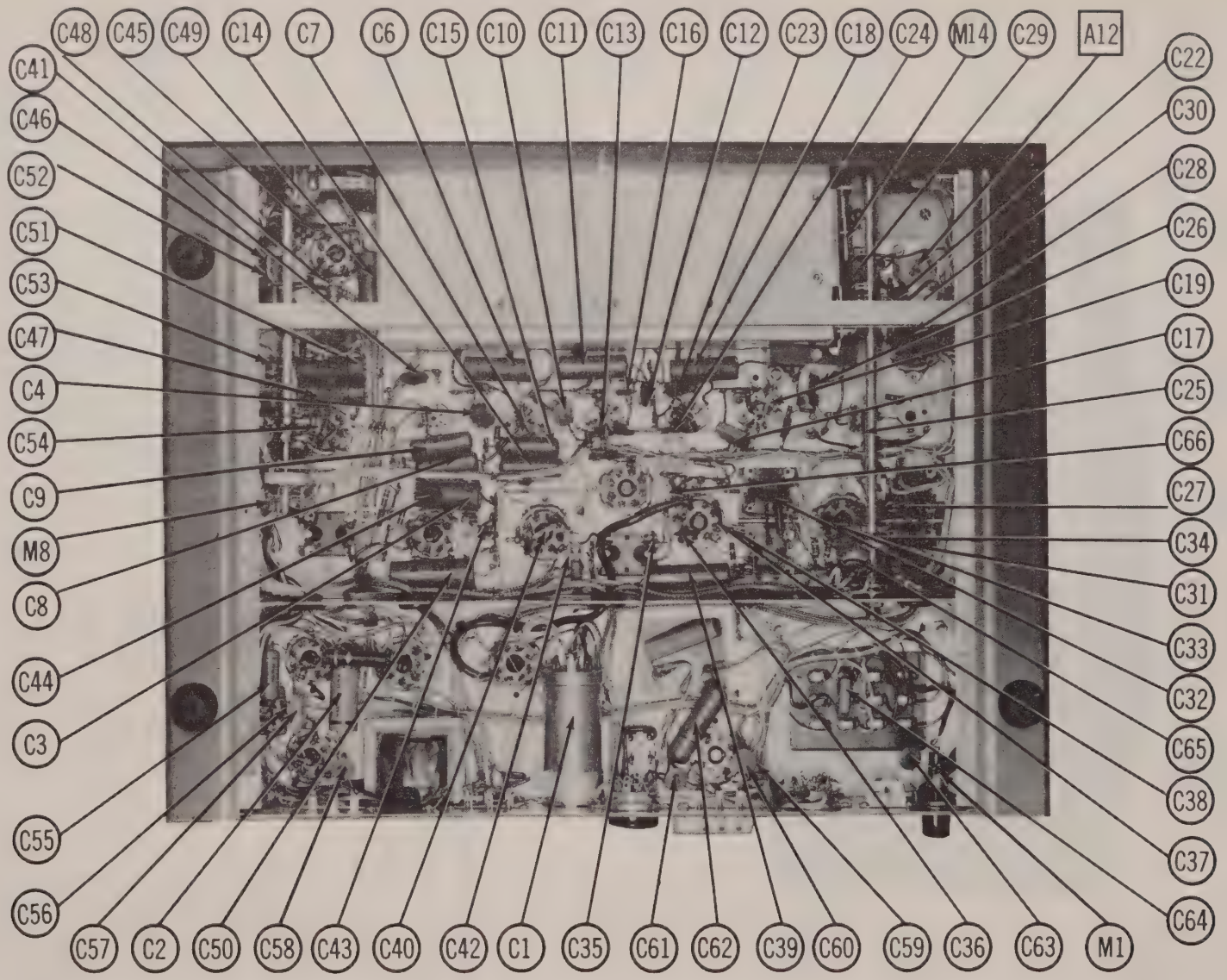
NATIONAL
MODEL HRO-60

TRADE NAME	National Model HRO-60		
MANUFACTURER	National Co., Inc., 61 Sherman St., Malden 48, Mass.		
TYPE SET	AC Operated Multi-Band AM Superheterodyne Communications Receiver		
TUBES	Eighteen		
POWER SUPPLY	110-120 Volts AC	RATING	1.0 Amp @ 117 Volts AC

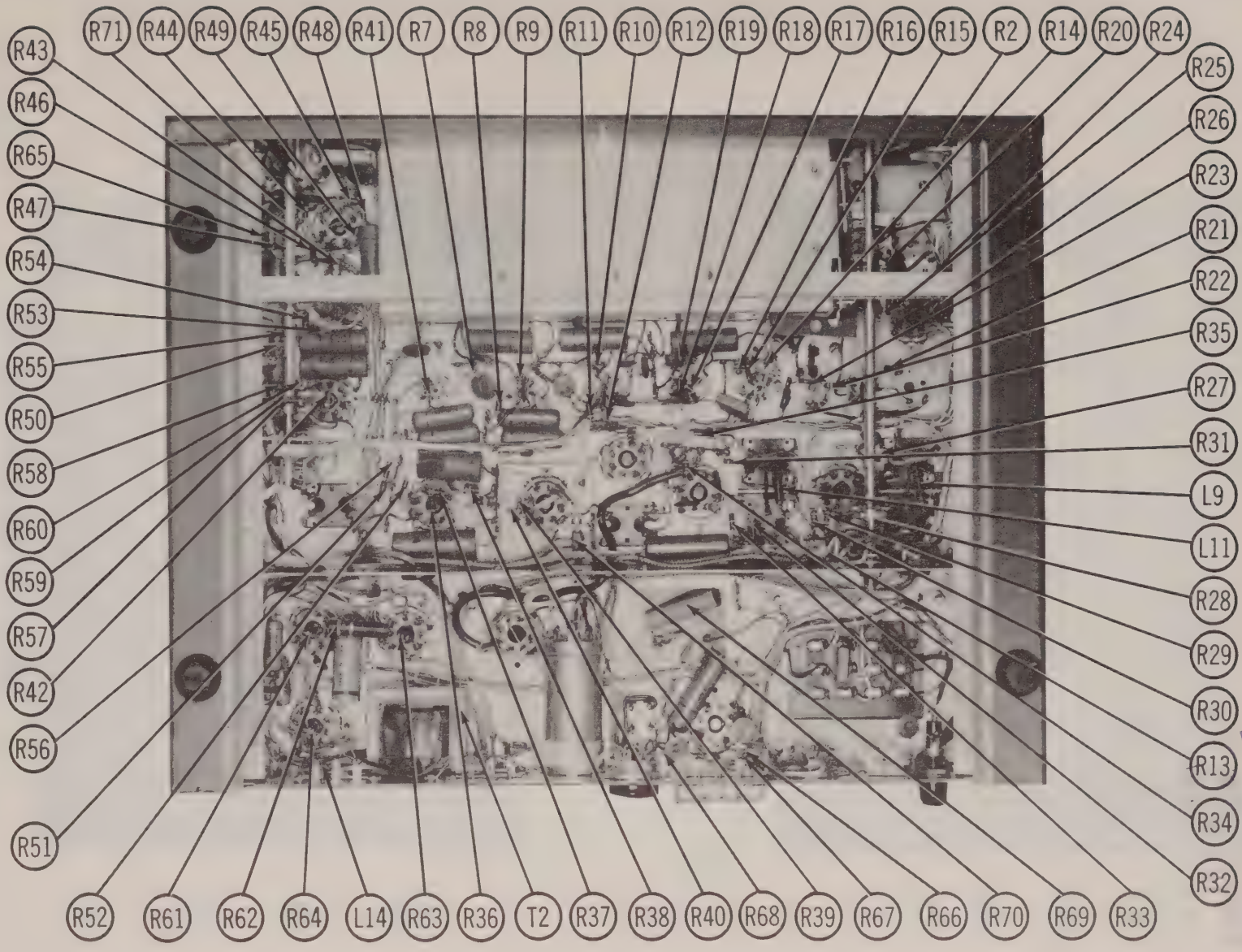
TUNING RANGES	Coil Set	General Coverage	Bandspread
	A	14-30MC	27.0-30.0MC
	B	7-14.4MC	14.0-14.4MC
	C	3.5-7.3MC	7.0-7.3MC
	D	1.7-4.0MC	3.5-4.0MC
	E	900-2050KC	
	F	480-960KC	
	G	180-430KC	
	H	100-200KC	
	J	50-100KC	
	AA		27.5-30MC
	AB	25.35MC	
	AC		21.0-21.5MC
	AD		50-54MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

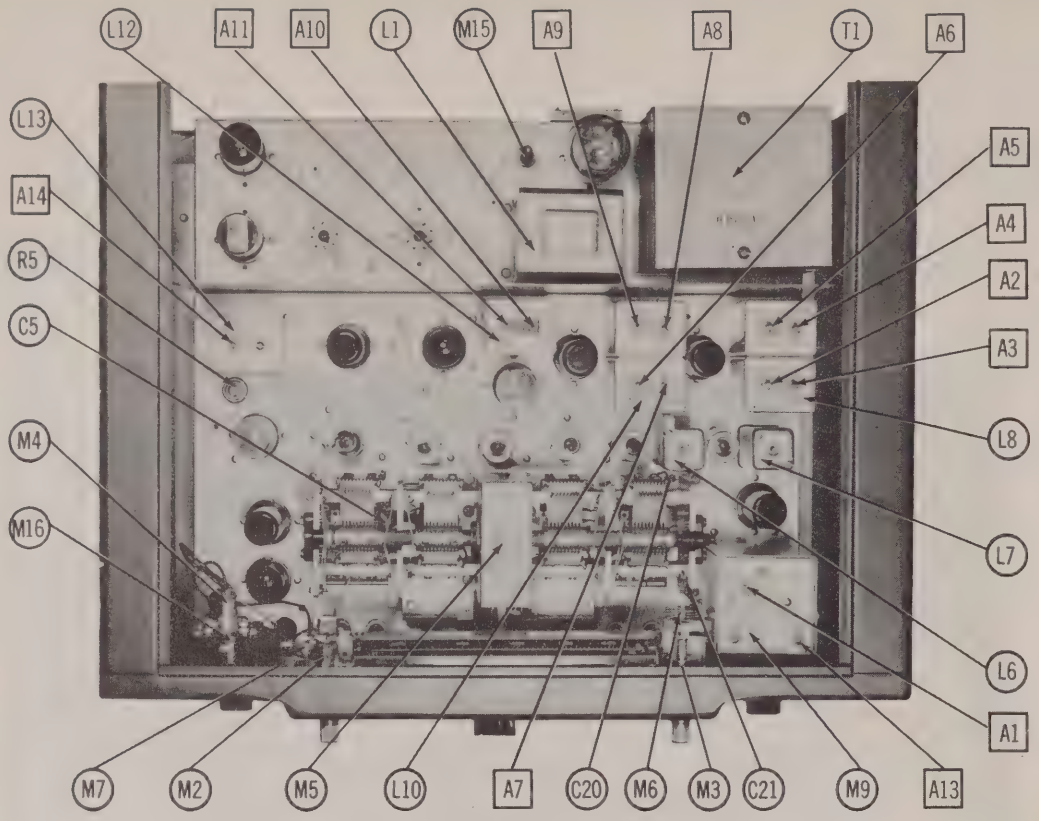
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



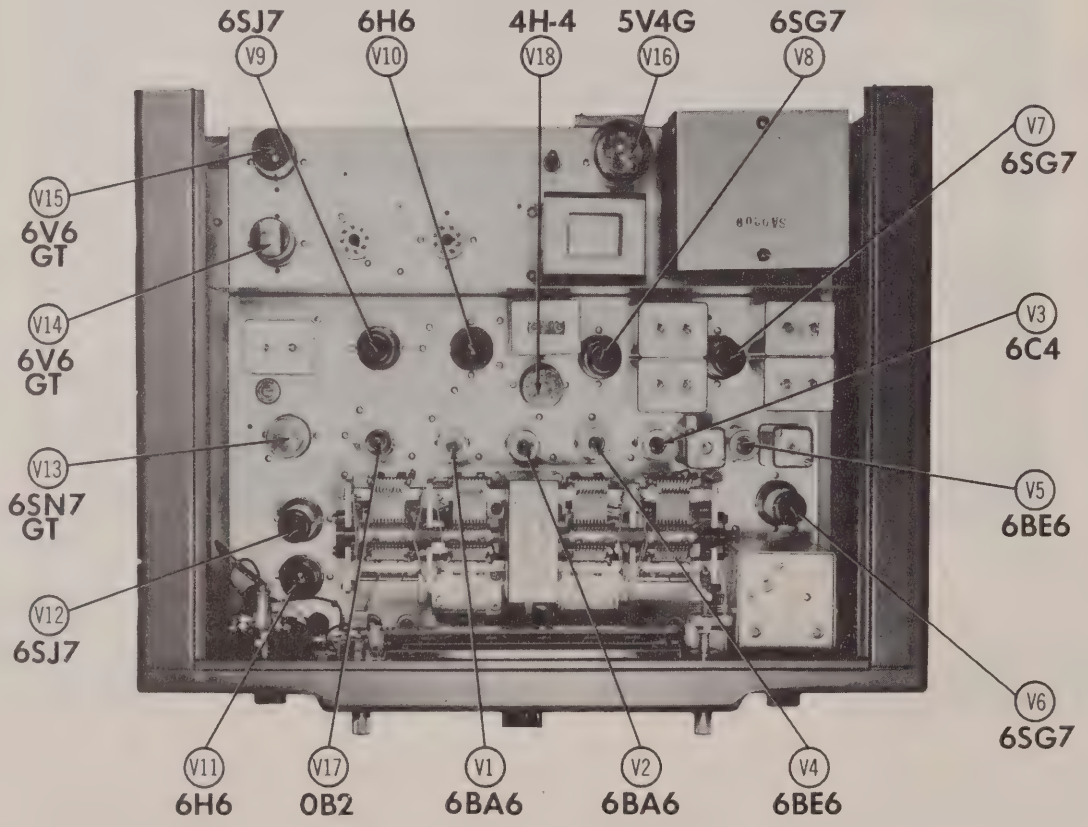
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS TOP VIEW



CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

MAIN TUNING DIAL

The main tuning dial should normally give no trouble. If, however, the dial should become removed from the receiver it must not be operated until mounted on the capacitor shaft with set screws tight. This is because the dial is only designed to rotate for ten revolutions (0 to 500) and if turned afarther than this the mechanism will be damaged. When mounted on the capacitor, limit stops protect the dial. The procedure for remounting the dial is as follows:

1. Place the dial on the capacitor shaft, tighten set screws and turn the dial counter clockwise to fully mesh capacitor rotor plates so that the tips of the rotor plates are flush with the edges of the stator plates.
2. Loosen set screws and rotate dial slowly until the dial reading has decreased to zero.
3. Tighten the set screws.
4. Check position of rotor plates at zero. The tips of the rotor plates must be flush with the edge of the stator plates. A slight adjustment may be necessary and this is done by loosening the set screws, adjusting the position of the dial and tightening the set screws again.

If it is necessary to remove the dial at any future time, turn to 250 before removing the dial and do not disturb the setting of either the dial or capacitor until reassembled. If in doubt about the correct position, inspect the springs on the back of the dial. When the dial reads 250 these springs should be straight up and down, they must not be tipped to one side.

It is important that the backplate and dial do not become separated. The backplate is held in place by two springs so that its gear teeth mesh with the dial gear teeth in correct relationship for proper dial operation. If this backplate should be sprung out of place, it may return to an incorrect position and the proper dial numbers will not appear in the windows when the dial is used. To ascertain that the two parts are in correct position proceed as follows:

1. Locate small window near outer periphery of dial backplate and also locate dial number window on face of dial which is 180 degrees removed from the small backplate window.
2. Hold dial so backplate lies flat in palm of left-hand and with right hand rotate dial knob until 250 appears in previously located dial window.
3. If dial is properly adjusted it will be noted that the pointer at the outer edge of the small window lines up with a marked tooth on the dial itself. It will be found that the dial and backplate can be moved so that the backplate pointer will mesh between teeth at points equidistant from marked tooth in either direction.
4. If by checking as in paragraph 3 the dial is found not properly adjusted, it will be necessary to separate the backplate from the dial far enough to bring the two gears out of mesh and the re-mesh the two parts until the proper setting is found. A number of trial settings may be required before the correct mesh is found.

SLIDE RULE TUNING DIAL

The slide-rule tuning dial assembly has been adjusted at the factory for accurate synchronization with the micrometer dial. If not tampered with this mechanism will provide complete freedom of mechanical trouble over a long period of continuous use. It is driven by an anti-backlash tuning gear ganged with the main tuning dial. The slide-rule dial pointer is controlled by a string drive assembly.

If replacement of the string drive cord is required it will be necessary to remove the receiver chassis from its cabinet wraparound. Before removing the micrometer dial reference should be made to preceding paragraph for proper metliod of removal. Refer to the dial cord stringing diagram for the proper method of replacing the cord. After the cord has been replaced and before the receiver is returned to its cabinet the micrometer dial should temporarily be replaced and the slide-rule pointer correctly set in the following manner:

(NOTE: This procedure may also be used if a check is desired to assure that the slide-rule dial pointer is properly synchronized with that of the main tuning dial.)

1. Check the main tuning dial at zero on its dial scale. The tips of the rotor plates should be flush with the edge of the stator plates.
2. Set the Band Selector control so that the D coil set scale appears.
3. Set the main tuning dial at 490 on its dial scale. Connect setting of the slide-rule dial pointer is 4 megacycles on the dial scale. Draw the slide rule pointer along the cord to its proper position being careful not to disturb the setting of the micrometer dial. After the correct setting has been obtained and use a small amount of glyptol or household cement to fasten the dial pointer securely in place on the cord.

ALIGNMENT INSTRUCTIONS

This receiver has been accurately calibrated by the manufacturer and is very stable. Realignment should not be necessary unless the receiver has been tampered with or unless component parts or tubes have been replaced. It is preferred that the individual aligning the receiver be one who is familiar with communication receivers and experienced with alignment there of.

To determine if IF Alignment is needed the following check should be performed:

1. Adjust the receiver for normal operation with the antenna disconnected.
2. Connect a pair of headphones to the phones jack.
3. Set the AVC switch at OFF.
4. Set the control switch to CW.
5. Set the phasing control at ZERO.
6. Set the crystal selectivity switch at "5".
7. Set the RF gain control at "10".

The AF gain control may be adjusted to a comfortable listening level and will not affect results.

Adjust the CWO control to a point where the predominate pitch of the background noise is lowest and a distinct ring of the crystal is heard. Note the setting of the CWO control.

Turn the crystal selectivity switch to OFF, and again adjust the CWO control for lowest pitch of background noise. Compare this setting with the previous setting.

If the two settings are identical, the IF is properly aligned at the cyrstal frequency. If they are not identical perform IF amplifier alignment.

SECOND CONVERSION IF ALIGNMENT

The second conversion IF frequency of this receiver is 455KC plus or minus 2KC. The exact frequency is determined by the resonant frequency of the crystal in the crystal filter assembly.

Plug in the D range coil set.

Connect the high side of a signal generator output lead to the stator of the mixer section of the tuning gang. Connect the low side to the tuning gang frame.

Connect an output meter across the output terminals.

Set the control switch to CW.

Set the AVC switch to OFF.

Set the phasing control at ZERO.

Set the selectivity switch at "5".

Set the AF gain control at "10".

Set the RF gain control at "9".

Set the signal generator at approximately 455KC with the modulation off.

Set output of the generator to obtain approximately 100 microvolts.

Turn the CWO control to obtain a beat between 400 and 1000. cycles. The presence of the beat note may be checked by temporarily connecting a pair of phones to the phone jack. If difficulty is encountered in obtaining a beat note, adjust the BFO coil slug, A14.

Slowly vary the signal generator frequency between 453 and 457KC. Somewhere between these limits the output will show a sharp peaked increase, this is the frequency of the crystal, and the frequency to which the second conversion IF is aligned.

Turn the selectivity switch at "1".

Turn the control switch to "AM".

Turn the signal generator modulation ON.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Direct	High side to stator on mixer section of tuning gang. Low side to tuning gang frame.	IF Crystal freq. (See note above) (400∿Mod)	Coil set "D".	Point of non - interference	Across output terminals.	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11	Adjust for maximum output. Attenuate signal generator to prevent overloading. The order of adjustment is not important.
2.	"	"	IF Crystal freq. plus 2KC.	"	"	"	A12	Adjust for maximum output.
3.	"	"	IF Crystal freq.(Same as step 1).	"	"	"	A13	"
4.	"	"	"	"	"	"	A14	Turn the selector switch to "CW". Adjust the CWO control to obtain zero beat. If zero beat does not occur at "0" on the CWO control knob, set knob at "0" and adjust A14 for zero beat.

ALIGNMENT INSTRUCTIONS (CONT.)

FIRST CONVERSION CONVERTER ALIGNMENT

Leave the signal generator connected as during Second Conversion IF Alignment.
Set the control switch to AM.
Set the AVC switch to OFF.
Set the phasing control at ZERO.
Set the selectivity switch at OFF.
Set the AF gain control at "10".
Set the RF gain control at "9".
Plug in the 'B' range coils.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5.	Direct	High side to stator of mixer section of tuning gang. Low side to frame of tuning gang.	2010KC (400^Mod)	Coil set "B".	Point of non-interference.	Across output terminals.	A15	Adjust for a distinct peak on the output meter. If A15 is badly misadjusted more than one peak may be found. The correct peak will be of much higher amplitude than any of the spurious peaks.
6.	"	"	"	"	"	"	A16, A17	Adjust for maximum output.

GENERAL COVERAGE OSC. & RF ALIGNMENT

The general coverage portion of this receiver has been properly aligned at the factory, using precision crystal controlled signal generators. Alignment should not be attempted unless proper precision equipment is available.
The need for realignment of the high frequency oscillator is indicated by the calibration being off more than 1% at the high frequency end of the dial scale.
Particular care must be exercised when adjusting the RF oscillator trimmer in each coil set. Three different checking procedures must be followed.
The coil sets below 7MC must be adjusted so the oscillator frequency is higher than the RF frequency. The image frequency should be 910KC below the signal frequency on the dial.
The oscillator for frequencies between 7MC and 35MC is set to the higher frequencies, but the image is 4020KC below the signal frequency. In some cases this frequency will be off the lower range of the coil set. In these cases special procedure must be used to check for the image.
In the 50MC to 54MC coil set, the oscillator must be adjusted to a frequency lower than the RF frequency.
The following methods should be used to ascertain that the oscillator is correctly adjusted on all coil sets:

1. When adjusting the oscillator in the coil sets below 7MC, the receiver should be tuned to a frequency 910KC below the RF frequency, at which point the image should appear. If it does not the oscillator trimmer should be decreased in capacity until the fundamental and image frequencies appear in correct positions on the dial.
2. When adjusting the oscillator on coil sets between 7MC and 35MC, the image must appear 4020KC below the RF frequency. In the cases where this frequency is beyond the range of the coil set, the receiver dial should be left at the proper frequency and the signal generator tuned to 4020KC above the RF frequency. It may be necessary to increase the generator output considerably to receive the image. The image must appear at the present dial position for proper oscillator tracking.
3. The oscillator for the AD coil set must be adjusted to the low frequency side of the RF signal. In this instance the image must be located 4020KC above the RF frequency. Leave the receiver tuned to the RF frequency and tune the generator 4020KC lower than the RF frequency. It may be necessary to increase the generator output to obtain the image. If the image is not present at this point the oscillator is not correctly adjusted.

Set the control switch to AM.
Set the AVC switch to OFF.
Set the RF gain control to "10".
Set the bandspread switches to general coverage.
Set the AF gain control to provide a suitable output level.
Check the position of the antenna trimmer and oscillator trimmer knobs. They should be set with the arrow pointing straight up.
Correction of tracking errors in the RF and mixer stages at the low frequency end of each coil set is accomplished by adjustment listed in the table. The actual tracking may be checked by pressing the end plates of the tuning gang sections either closer or away from the adjacent plate (do not bend plate enough so that it will not spring back to its original position). A change in capacity in either direction should decrease the output.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	270Ω Carbon Resistors	High side thru 270Ω to antenna terminal. Low side to chassis.	30MC (400^Mod)	Plug in coil set "A".	30MC	Across voice coil.	A18 (pos 8) A19 (pos 6) A20 (pos 4)	Adjust in order given for maximum output.
8.	"	"	14.4MC	"	14.4MC	"	A21 (pos 16) A22 (pos 13) A23 (pos 11) A24 (pos 9)	Adjust in order given for max. output. Repeat steps 1 & 2 until no further improvement can be made.
9.	"	"	14.4MC	Plug in coil set "B".	14.4MC	"	A25 (pos 8) A26 (pos 6) A27 (pos 4) A28 (pos 2)	Adjust in order given for maximum output.
10.	"	"	7.0MC	"	7.0MC	"	A29 (pos 16) A30 (pos 13) A31 (pos 11) A32 (pos 9)	Adjust in order given for max. output. Repeat steps 9 & 10 until no further improvement can be made
11.	"	"	7.3MC	Plug in coil set "C".	7.3MC	"	A33 (pos 8) A34 (pos 6) A35 (pos 4) A36 (pos 2)	Adjust in order given for max. output.
12.	"	"	3.5MC	"	3.5MC	"	A37 (pos 16) A38 (pos 13) A39 (pos 11) A40 (pos 9)	Adjust in order given for max. output. Repeat steps 11 & 12 until no further improvement can be made.
13.	"	"	1.8MC	Plug in coil set "D".	1.8MC	"	A41 (pos 8) A42 (pos 6) A43 (pos 4)	Adjust in order given for max. output.
14.	"	"	4.0MC	"	4.0MC	"	A44 (pos 16) A45 (pos 13) A46 (pos 11) A47 (pos 12)	Adjust in order given for max. output. Repeat steps 13 & 14 until no further improvement can be made
15.	"	"	2.0MC	Plug in coil set "E".	2.0MC	"	A48 (pos 8) A49 (pos 6) A50 (pos 4)	Adjust in order given for max. output.
16.	"	"	1 MC	"	1 MC	"	A51 (pos 7)	Adjust for max. output.
17.	"	"	1.4MC	"	1.4MC	"	A52 (pos 16)	Adjust for max output. Repeat steps 15, 16 & 17 until no further improvement can be made.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
18.	"	"	.9MC	Plug in coil set "F".	.9MC	"	A53 (pos 8) A54 (pos 6) A55 (pos 4) A56 (pos 2)	Adjust in order given for max. output.
19.	"	"	.5MC	"	.5MC	"	A57 (pos 7)	Adjust for max. output.
20.	"	"	.7MC	"	.7MC	"	A58 (pos 16)	Repeat steps 18, 19, & 20 until no further improvement can be made.
21.	"	"	400KC	Plug in coil set "G".	400KC	"	A59 (pos 8) A60 (pos 6) A61 (pos 4)	Adjust in order given for max. output.
22.	"	"	200KC	"	200KC	"	A62 (pos 7)	Adjust for max. output.
23.	"	"	300KC	"	300KC	"	A63 (pos 16)	Adjust for max. output. Repeat setps 21, 22 & 23 until no futher improvement can be made.
24.	"	"	200KC	Plug in coil set "H".	200KC	"	A64 (pos 8) A65 (pos 6) A66 (pos 4) A67 (pos 2)	Adjust in order given for max. output.
25.	"	"	100KC	"	100KC	"	A68 (pos 8)	Adjust for max. output.
26.	"	"	150KC	"	150KC	"	A69 (pos 16)	Adjust for max. output. Repeat steps 24, 25, & 26 until no further improvement can be made.
27.	"	"	100KC	Plug in coil set "J"	100KC	"	A70 (pos 8) A71 (pos 6) A72 (pos 4) A73 (pos 2)	Adjust in order given for max. output.
28.	"	"	50KC	"	50KC	"	A74 (pos 7)	Adjust for max. output.
29.	"	"	75KC	"	75KC	"	A75 (pos 16)	Adjust for max. output. Repeat steps 27, 28, & 29 until no further improvement can be made.
30.	"	"	30MC	Plug in coil set "AA"	30MC	"	A76 (pos.7) A77 (pos.5) A78 (pos. 3) A79 (pos.1)	Adjust in order given for maximum output.
31.	"	"	27.2MC	"	27.2MC	"	A80 (pos.8) A81 (pos. 6) A82 (pos.4) A83 (pos.2)	"
32.	"	"	28MC	"	28MC	"	A84 (pos.16) A85 (pos. 13) A86 (pos. 11) A87 (pos. 9)	Adjust in order given for maximum output. Repeat steps 30, 31 and 32 until no further improvement can be made.
33.	"	"	35MC	Plug in coil set "AB"	35MC	"	A88 (pos.8) A89 (pos.6) A90 (Pos.4) A91 (pos.2)	Adjust in order given for maximum output.
34.	"	"	25MC	"	25MC	"	A92 (pos. 7) A93 (pos. 5) A94 (pos. 3) A95 (pos.1)	"
35.	"	"	30MC	"	30MC	"	A96 (pos.16) A97 (pos.13) A98 (pos. 11) A99 (pos. 9)	Adjust in order given for maximum output. Repeat steps 33, 34 and 35 until no further improvement can be made.
36.	"	"	21.5MC	Plug in coil set "AC"	21.5MC	"	A100(pos.7) A101 (pos.6) A102 (pos.4) A103 (pos.2)	Adjust in order given for maximum output.
37.	"	"	21MC	"	21MC	"	A104 (pos.6) A105 (pos.5) A106 (pos.3) A107 (pos. 1)	"
38.	"	"	21.3MC	"	21.3MC	"	A108 (pos.16) A109 (pos.13) A110 (pos.11) A111 (pos.9)	Adjust in order given for maximum output. Repeat steps 36, 37 and 38 until no further improvement can be made.
39.	"	"	54MC	Plug in coil set "AD"	54MC	"	A112(pos.7) A113 (pos.5) A114 (pos.3) A115 (pos.1)	Adjust in order given for maximum output.
40.	"	"	50MC	"	50MC	"	A116 (pos.8) A117 (pos.6) A118 (pos.4) A119 (pos.2)	"
41.	"	"	52MC	"	52MC	"	A120 (pos.16) A121 (pos.13) A122 (pos.11) A123 (pos.9)	Adjust in order given for maximum output. Repeat steps 39, 40 and 41 until no further improvement can be made.

BAND SPREAD OSC. & RF ALIGNMENT

It is important that general coverage alignment be performed before bandspread alignment, since general coverage alignment affects bandspread alignment. General coverage alignment is not affected by bandspread alignment, so if only bandspread alignment is required it may be performed separately.
The need for oscillator alignment of any band is indicated by the main tuning dial being off more than 5 divisions in either direction.
The pre-alignment settings of the receiver controls are the same as for general coverage alignment, EXCEPT, that the bandspread switch on each coil set must be switched to BANDSPREAD.
The low frequency tracking may be checked by making a slight adjustment of the trimmer capacitors at positions 1, 3 and 5. A slight change in either direction should decrease the output. The trimmers should be reset at the high frequency end of each band.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
42.	270Ω Carbon Resistor	High side thru 270Ω to antenna terminal. Low side to chassis.	30MC (400^Mod)	Plug in Coil Set "A"	30MC	Across output terminals	A124 (pos.7) A125 (pos.5) A126 (pos.3) A127 (pos.1)	Adjust in order given for maximum output.
43.	"	"	27.2MC	"	27.2MC	"	A128 (pos.15) A129 (pos.14) A130(pos.12) A131 (pos.10)	Adjust in order given for maximum output. Repeat steps 42 and 43 until no further improvement can be made.
44.	"	"	14.4MC	Plug in Coil Set "B"	14.4MC	"	A132(pos.7) A133 (pos.5) A134 (pos.3) A135 (pos. 1)	Adjust in order given for maximum output.
45.	"	"	14MC	"	14MC	"	A136 (pos.15) A137 (pos.14) A138 (pos.12) A139 (pos.10)	Adjust in order given for maximum output. Repeat steps 44 and 45 until no further improvement can be made.
46.	"	"	7.3MC	Plug in Coil Set "C"	7.3MC	"	A140 (pos.7) A141 (pos.5) A142 (Pos.3) A143 (pos.1)	Adjust in order given for maximum output.
47.	"	"	7.0MC	"	7.0MC	"	A144 (pos.15) A145 (pos.14) A146 (pos.12) A147 (pos.10)	Adjust in order given for maximum output. Repeat steps 46 and 47 until no further improvement can be made.
48.	"	"	4.0MC	Plug in coil set "D"	4.0MC	"	A148 (pos.7) A149 (pos.5) A150 (pos.3) A151 (pos.1)	Adjust in order given for maximum output.
49.	"	"	3.5MC	"	3.5MC		A152 (pos.15) A153 (pos.14) A154 (pos.12) A155 (pos.10)	Adjust in order given for maximum output. Repeat steps 48 and 49 until no further improvement can be made.

FIRST RF STAGE ALIGNMENT WITH LOW IMPEDANCE TRANSMISSION LINE

If a low impedance transmission line is used with this receiver, it may be necessary to align the 1st. RF Amplifier at the high frequency end of each band. To check for this possibility rotate the antenna trimmer control. The presence of two distinct peaks in output indicate that the RF Amplifier is tracking properly. Lack of a peak or presence of only one peak indicates improper tracking and need for correction.

GENERAL COVERAGE ADJUSTMENTS

Set the band spread switches on each coil set to be aligned to general coverage.
Set the control switch to AM.
Set the selectivity switch at OFF.
Set antenna trimmer control knobs so the arrow points straight up towards top of set.
Set the AF gain control at "10".
Set the RF gain to a suitable listening volume.
Coil sets A, D, E and G do not use a 1st. RF Amplifier general coverage trimmer, but are peaked by the antenna trimmer control over the full range of the coil set.
Connect the antenna feeders to the receiver antenna terminals and tune the receiver to the signal frequency first shown in the general coverage Osc. & RF Alignment table for each coil set (Coil set "A", 30MC, coil set "B", 7MC, etc.).
Peak trimmers as follows for maximum signal, or if no signal is available, for maximum background noise.

Coil Set A	Adjust Ant. Trimmer Control
Coil Set B	Adjust A27 (pos. 4)
Coil Set C	Adjust A34 (pos. 4)
Coil Set D	Adjust Ant. Trimmer Control
Coil Set E	Adjust Ant. Trimmer Control
Coil Set F	Adjust A54 (pos. 2)
Coil Set G	Adjust Ant. Trimmer Control
Coil Set H	Adjust A65 (pos. 2)
Coil Set J	Adjust A71 (pos. 2)
Coil Set AA	Adjust A77 (pos. 1)
Coil Set AB	Adjust A89 (pos. 2)
Coil Set AC	Adjust A101 (pos. 2)

BANDSPREAD ADJUSTMENTS

Set the bandspread switches on each coil set to be aligned to bandspread position.
Set the receiver controls in the same manner as general coverage.
Connect the antenna feeders to the receiver antenna terminals, and tune to the signal frequency first shown on the bandspread Osc. & RF adjustment table for each coil set.
Peak the trimmers as follows for maximum signal, or if no signal is available for maximum background noise.

Coil Set A	Adjust A125 (pos. 1)
Coil Set B	Adjust A133 (pos. 1)
Coil Set C	Adjust A141 (pos.1)
Coil Set D	Adjust A149 (pos.1)

S-METER ADJUSTMENT

The "S" meter balancing resistor R5 is used to obtain zero meter reading in the absence of signal.
Set the RF gain control at "0".
Set the AVC switch to AVC.
Set the control switch to AM.
Adjust R5 until "S" meter reads zero.

SET 202 FOLDER 4

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	1st. RF Amplifier	6BA6	6BA6	7BK	
V2	2nd. RF Amplifier	6BA6	6BA6	7BK	
V3	H.F. Oscillator	6C4	6C4	6BG	
V4	Mixer	6BE6	6BE6	7CH	
V5	Converter	6BE6	6BE6	7CH	
V6	1st. IF Amplifier	6SG7	6SG7	8BK	
V7	2nd. IF Amplifier	6SG7	6SG7	8BK	
V8	3rd. IF Amplifier	6SG7	6SG7	8BK	
V9	C.W. Oscillator	6SJ7	6SJ7	8N	
V10	Detector-AVC	6H6	6H6	7Q	
V11	Noise Limiter	6H6	6H6	7Q	
V12	AF Amplifier	6SJ7	6SJ7	8N	
V13	Phase Inverter-"S" Meter Amp.	6SN7GT	6SN7GT	8BD	
V14	Audio Output	6V6GT	6V6GT	7S	
V15	Audio Output	6V6GT	6V6GT	7S	
V16	Rectifier	5V4G	5V4G	5L	
V17	Voltage Reg.	0B2	0B2		
V18	Current Reg.	4H-4	4H-4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTE
C1A	▲40	475	K945-3	AFH2-72		BO53		FP262	TVL-2830	
B	▲40	475								
C2	25	50	E338-4	PRS50/25		BR255A		TC36	TVA-1306	
C3	25	50	E338-4	PRS50/25		BR255A		TC36	TVA-1306	
C4	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C5	10000	500	J666-56	1464-01				MC475		
C6	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C7	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C8	.05	400	L217-29	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C9	.05	400	L217-29	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C10	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C11	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C12	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C13	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C14	.05	400	L217-29	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C15	.05	400	L217-29	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C16	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C17	10000	500	K946-2	1467-01				MC475		
C18	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C19	100		D825C-304	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C20	5		D825D-401	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C21	10		D825D-402	SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C22	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C23	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C24	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C25	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C26	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C27	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C28	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C29	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C30	1000		K375-4	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C31	1000		K375-4	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C32	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C33	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C34	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C35	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C36	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C37	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C38	1000		K375-4	SI1000	DC-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C39	.25	200	L217-48	P288-25		PJ2P25		PT4025	2TM-P25	
C40	100		D825D-421	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C41	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R47	220KΩ	½	J569-53	BTS-220K	
R48	470kΩ	½	J569-57	BTS-470K	
R49	220KΩ	½	J569-53	BTS-220K	
R50	820KΩ	½	J569-60	BTS-820K	
R51	2200Ω	½	J569-29	BTS-2200	
R52	150Ω	½	J569-15	BTS-150	
R53	470KΩ	½	J569-57	BTS-470K	
R54	100KΩ	½	J569-49	BTS-100K	
R55	47KΩ	½	J569-45	BTS-47K	
R56	6800Ω	½	J569-35	BTS-6800	
R57	220KΩ	½	J569-53	BTS-220K	
R58	4700Ω	½	J569-33	BTS-4700	
R59	47KΩ	½	J569-45	BTS-47K	

Note 1. May be from 100Ω to 1000Ω. Individually chosen to meet the requirements of each receiver.
Note 2. Some Models use a 150Ω resistor in this application.

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R60	47KΩ	½	J569-45	BTS-47K	
R61	220KΩ	½	J569-53	BTS-220K	
R62	180Ω	2	J572-16		
R63	33Ω	½	J569-7		
R64	220KΩ	½	J569-53	BTS-220K	
R65	470Ω	2	J572-21	BTB-470	
R66	100Ω	½	J569-13		
R67	100Ω	½	J569-13		
R68	100Ω	½	J569-13		
R69	5000Ω	10	E959-10	1 3/4A-5000	
R70	4.3Ω	2	K098-48		
R71	4.3Ω	2	K098-48		

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @ 1A with tap for 230VAC	550VCT .130ADC	5VAC @ 3A	6.3VAC @ 4.6A SEC 4 13VAC @ .46A	SA9209				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	8.2KΩ CT	500Ω Tap @ 8Ω	312ΩCT	21Ω Tap @ .66Ω	P187-1					

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.065A	290Ω	17HY	SA1694				

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L2A	Ant. Trans.	.2Ω	0Ω	SA:8363				A Band, 14-30MC
B	Ant. Trans.	.3Ω	.2Ω	SA:6755				B Band, 7-14.4MC
C	Ant. Trans.	.3Ω	.2Ω	SA:6759				C Band, 3.5-7.3MC
D	Ant. Trans.	.5Ω	.7Ω	SA:6635				D Band, 1.7-4MC
E	Ant. Trans.			SA:6513				E Band, 900-2050KC
F	Ant. Trans.			SA:6660				F Band, 480-960KC
G	Ant. Trans.			SA:6665				G Band, 180-420KC
H	Ant. Trans.			SA:6803				H Band, 100-200KC
I	Ant. Trans.			SA:6808				J Band, 50-100KC
J	Ant. Trans.			SA:6814				AA Band, 27-30MC
K	Ant. Trans.			SA:6675				AB Band, 25-35MC
L	Ant. Trans.			SA:8073				AC Band, 21-21.5MC
M	Ant. Trans.			SA:9261				AD Band, 50-54MC

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA NATIONAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C42	270		J633-2	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C43	3		J695-4							
C44	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C45	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C46	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C47	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C48	10000		K946-2	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C49	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C50	.5	200	L217-47	P488-5		PJ2P5		PT405	2TM-P5	
C51	.1	400	L217-35	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C52	.01	600	D827-7	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C53	.01	600	D827-7	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C54	100		D825D-421	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C55	.01	600	L217-16	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C56	.01	600	L217-16	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C57	2400	1000	J667-68							
C58	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C59	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C60	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C61	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C62	.1	600	L217-36	P688-1		PTE6P1		PT601	6TM-P1	
C63	5000		K946-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	Note 1
C64	10000	500	J666-56	1467-01				MC475		
C65	.01	600	K946-2	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C66	10	500	D825D-473	SI10	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	

Note 1. Some Models use .01MFD in this application (Part #K946-2)

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	J681-2					Limiter & Switch
R2	5000Ω	3	K349-4					RF Gain-Wire Wound
R3A	500KΩ	½	K347-1	Q13-133	AG-60-Z	B-60-S	U-48	AF Gain
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R3A
R4A	500KΩ	½	K347-1	Q13-133	AG-60-Z	B-60-S	U-48	Tone
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R4A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R4A
R5A	1000Ω	1	D831-2	W-100	A43-1000		R1000L	"S" Meter Adjustment
B	Shaft		Not Req.	Not Req.	FKS-1/4		Not Req.	Attach to R5A
R6A	25Ω	2	K915-13	W-25	A43-25	V-111	R25L	Dimmer
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R6A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA NATIONAL PART No.	IRC PART No.	NOTES
R7	470KΩ	½	J569-57	BTS-470K	
R8	100Ω	½	J569-13	BTS-100	
R9	47KΩ	½	J569-45	BTS-47K	
R10	470KΩ	½	J569-57	BTS-470K	
R11	560Ω	½	J569-22	BTS-560	
R12	100KΩ	½	J569-49	BTS-100K	
R13	100KΩ	1	J571-49	BTA-100K	
R14	22KΩ	½	J569-41	BTS-22K	
R15	22Ω	½	J569-5		
R16	2200Ω	½	J569-29	BTS-2200	
R17	22KΩ	½	J569-41	BTS-22K	
R18	220Ω	½	J569-17	BTS-220	
R19	33KΩ	1	J571-43	BTA-33K	
R20	2200Ω	½	J569-29	BTS-2200	
R21	33Ω	½	J569-7		
R22	100KΩ	½	J569-49	BTS-100K	
R23	10KΩ	½	J569-37	BTS-10K	
R24	470KΩ	½	J569-57	BTS-470K	
R25	560Ω	½		BTS-560	Note 1
R26	47KΩ	½	J569-45	BTS-47K	
R27	2200Ω	½	J569-29	BTS-2200	
R28	470KΩ	½	J569-57	BTS-470K	
R29	330Ω	½		BTS-330K	Note 2
R30	47KΩ	½	J569-45	BTS-47K	
R31	2200Ω	½	J569-29	BTS-2200	
R32	470KΩ	½	J569-57	BTS-470K	
R33	150Ω	½	J569-15	BTS-150	
R34	47KΩ	½	J569-45	BTS-47K	
R35	2200Ω	½	J569-29	BTS-2200	
R36	100KΩ	½	J569-49	BTS-100K	
R37	100KΩ	½	J569-49	BTS-100K	
R38	220KΩ	½	J569-53	BTS-220K	
R39	1.5Meg	½	J569-63	BTS-1.5Meg	
R40	1.5Meg	½	J569-63	BTS-1.5Meg	
R41	47KΩ	½	J569-45	BTS-47K	
R42	1000Ω	½	J569-25	BTS-1000	
R43	22KΩ	½	J569-41	BTS-22K	
R44	470KΩ	½	J569-57	BTS-470K	
R45	220KΩ	½	J569-53	BTS-220K	
R46	220KΩ	½	J569-53	BTS-220K	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF) (CONT.)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA NATIONAL PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L3A	1st.RF Trans.	.7Ω	0Ω	SA:6751				A Band, 14-30MC, tertiary winding-8.5Ω
B	1st.RF Trans.	4.8Ω	.1Ω	SA:9258				B Band, 7-14.4MC
C	1st.RF Trans.	9.2Ω	.2Ω	SA:6641				C Band, 3.5-7.3MC
D	1st.RF Trans.	23Ω	.7Ω	SA:6637				D Band, 1.7-4MC
E	1st.RF Trans.			SA:6540				E Band, 900-2050KC
F	1st.RF Trans.			SA:6662				F Band, 480-960KC
G	1st.RF Trans.			SA:6667				G Band, 180-420KC
H	1st.RF Trans.			SA:6669				H Band, 100-200KC
I	1st.RF Trans.			SA:6809				J Band, 50-100KC
J	1st.RF Trans.			SA:9247				AA Band, 27-30MC
K	1st.RF Trans.			SA:6818				AB Band, 25-35MC
L	1st.RF Trans.			SA:8074				AC Band, 21-21.5MC
M	1st.RF Trans.			SA:9262				AD Band, 50-54MC
L4A	2nd.RF Trans.	.7Ω	0Ω	SA:6752				A Band, 14-30MC, Tertiary Winding-8.5Ω
B	2nd.RF Trans.	.2Ω	.1Ω	SA:9259				B Band, 7-14.4MC
C	2nd.RF Trans.	9.5Ω	.2Ω	SA:6642				C Band, 3.5-7.3MC
D	2nd.RF Trans.	23Ω	.7Ω	SA:6638				D Band, 1.7-4MC
E	2nd.RF Trans.			SA:6789				E Band, 900-2050KC
F	2nd.RF Trans.			SA:6794				F Band, 480-960KC
G	2nd.RF Trans.			SA:6800				G Band, 180-420KC
H	2nd.RF Trans.			SA:6804				H Band, 100-200KC
I	2nd.RF Trans.			SA:6810				J Band, 150-100KC
J	2nd.RF Trans.			SA:9248				AA Band, 27-30MC
K	2nd.RF Trans.			SA:6676				AB Band, 25-35MC
L	2nd.RF Trans.			SA:8075				AC Band, 21-21.5MC
M	2nd.RF Trans.			SA:9266				AD Band, 50-54MC
L5A	HF Osc.Coil	0Ω		SA:9254				A Band, 14-30MC, tapped
B	HF Osc.Coil	.1Ω		SA:9260				B Band, 7-14.4MC, tapped
C	HF Osc.Coil	.2Ω		SA:6760				C Band, 3.5-7.3MC, tapped
D	HF Osc.Coil	.7Ω		SA:6676				D Band, 1.7-4MC, tapped ⓐ .3Ω and ⓐ .8Ω
E	HF Osc.Coil			SA:6631				E Band, 900-2050KC
F	HF Osc.Coil			SA:6795				F Band, 480-960KC
G	HF Osc.Coil			SA:6785				G Band, 180-420KC
H	HF Osc. Coil			SA:6805				H Band, 100-200KC
I	HF Osc.Coil			SA:6811				J Band, 50-100KC
J	HF Osc.Coil			SA:9249				AA Band, 27-30MC
K	HF Osc.Coil			SA:9265				AB Band, 25-35MC
L	HF Osc.Coil			SA:9268				AC Band, 21-21.5MC
M	HF Osc.Coil			SA:9267				AD Band, 50-54MC
L6	2010KC IF Trans.	.9Ω	.9Ω	SA:9205				
L7	1555KC Osc. Coil			SA:9203				Includes .0001MFD cap. & 22KΩ resistor; tapped ⓐ .1Ω
L8A	2nd.IF Trans. Input	2.2Ω	2.4Ω	SA:8448				
B	2nd.IF Trans. Input	2.2Ω	2.4Ω					Part of L8A
L9	RF Choke	0Ω		SA:6072				1.1 Microhenries
L10A	3rd.IF Trans. input	2.2Ω	2.4Ω	SA:8448				
B	3rd.IF Trans. Output	2.2Ω	2.4Ω					Part of L10A
L11	RF Choke	0Ω		SA:6072				1.1 Microhenries
L12	4th.IF Trans.	2.4Ω	2.5Ω	SA:3363				
L13	BFO Coil	4Ω		SA:9193				Includes 22KΩ resistor & 270MMF cap.; tapped ⓐ .8Ω
L14	Speaker Output Choke	0Ω		SA:3992				1 Microhenry

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA NATIONAL PART No. FUSE	NATIONAL PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V	F135-4	E510-1	312002 (3AG-2A)	342001	AGC-2	HKP

Parts list continued on next page.

PROPERTY OF L. F. BLANKENSHIP 3324 [illegible] DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA NATIONAL PART No.		NOTES
M2	Bayonet	6-8	.15	Brown	F136-6		Type #47
M3	Bayonet	6-8	.15	Brown	F136-6		Type #47
M4	Bayonet	6-6	.15	Brown	F136-6		Type #47

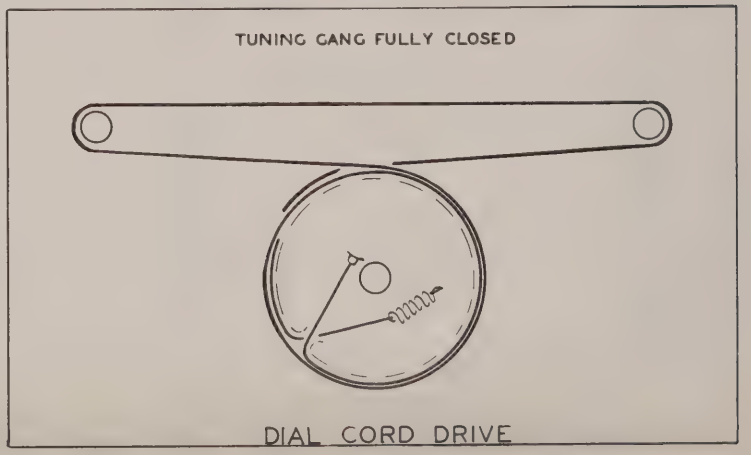
MISCELLANEOUS

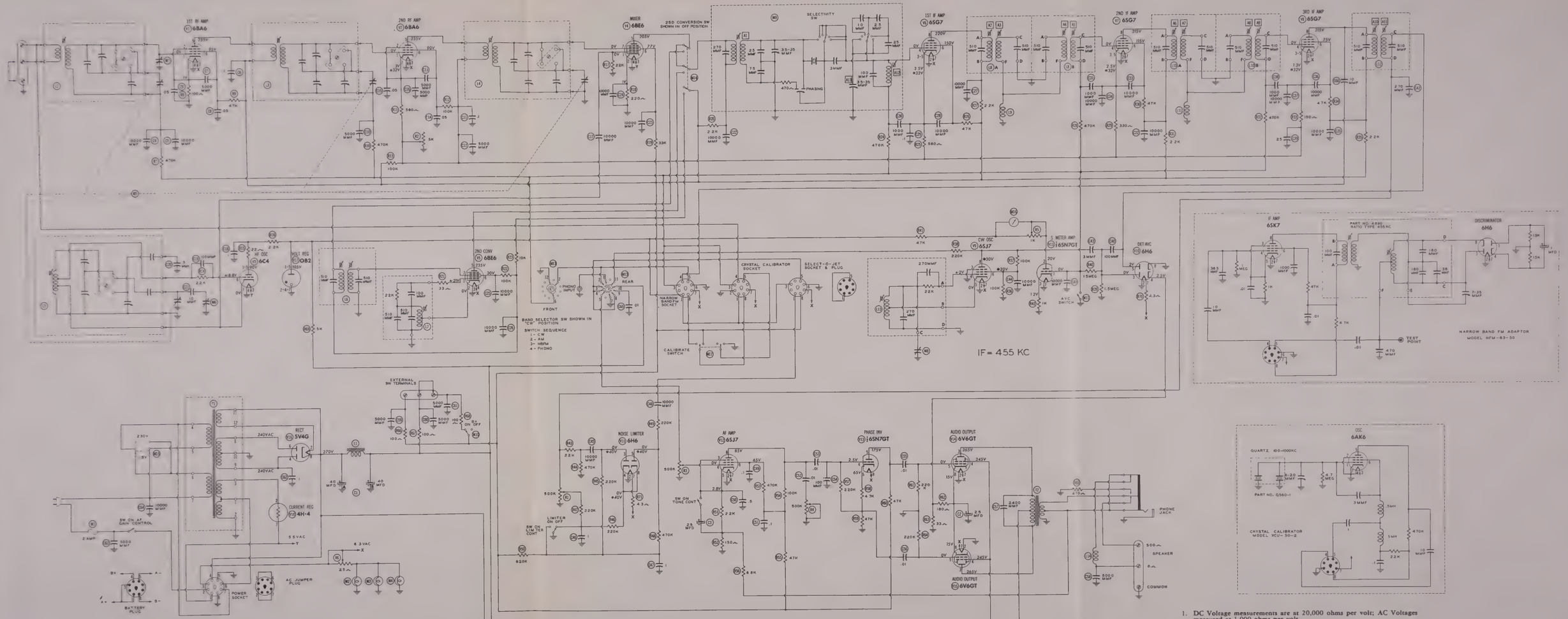
ITEM No.	PART NAME	NATIONAL PART No.	NOTES
M5	Tuning Capacitor	SA8667	Main (4 Sections)
M6	Tuning Capacitor	J957-31	Oscillator
M7	Tuning Capacitor	J957-32	Antenna
M8	Tuning Capacitor	J957-32	CW Osc. Adj.
M9	Coil	SA9202	IF Input
	Trimmer	H500-6	IF Primary
	Capacitor	D825D-411	25MMF 500VDC
	Capacitor	D825C-301	75MMF 500VDC
	Trimmer Capacitor	D832-2	Mica Variable 3.5-35MMF
	Crystal	E979-1	455KC
	Capacitor	D825D-449	3MMF 500VDC
	Variable Capacitor	SA9190	Phasing Control
	Switch	E195-1	Selectivity
	Capacitor	D832-2	3.5-35MMF Mica
	Capacitor	D825D-426	10MMF 500VDC
	Capacitor	D825D-411	25MMF 500VDC
	Capacitor	D825D-411	25MMF 500VDC
	Coil	SA9201	IF Output
	Resistor	J569-21	470Ω ½ watt
			Complete Assembly Part No. SA9195
M10	Switch	E230-2	B+ On/Off
M11	Switch	E230-2	AVC
M12	Switch	P738-1	Calibrate
M13	Switch	SA6564	Function Selector
M14	Switch	R027-1	2nd. Conversion On/Off
M15	Switch	H340-4	T1 Primary Selector
M16	Meter	J984-5	Signal Meter 0-1MA with "S" scale
	Dial Scale	P136-15	Band "A"
	Dial Scale	P136-16	Band "B"
	Dial Scale	P136-3	Band "C"
	Dial Scale	P136-4	Band "D"
	Dial Scale	P136-17	Band "A" (Bandspread only)
	Dial Scale	P136-18	Band "B" (Bandspread only)
	Dial Scale	P136-7	Band "C" (Bandspread only)
	Dial Scale	P136-8	Band "D" (Bandspread only)
	Dial Scale	P136-9	Band "E" and "F"
	Dial Scale	P136-10	Band "G" and "H"
	Dial Scale	P136-11	Band "J"
	Dial Scale	P136-19	Band "AA"
	Dial Scale	P136-20	Band "AB"
	Dial Scale	P136-14	Band "AC"
	Dial Scale	P136-21	Band "AD"
	Knob	SA7021	Tone, antenna trimmer and dimmer controls (3 Used)
	Knob	SA6868	Crystal phasing and CW Osc. Controls (2 Used)
	Knob	SA6869	Selectivity Control
	Knob	SA6870	Limiter Control
	Knob	SA6871	AF Gain Control
	Knob	SA6867	RF Gain Control
	Knob	SA6587	Function Selector
	Knob	SA6586	Main Tuning
	CW Osc. Shaft	Q534-2	

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	3.5Meg ¶500KΩ	100Ω	.1Ω	0Ω	†500Ω	†50KΩ	100Ω	
V 2	6BA6	3.5Meg ¶500KΩ	5600Ω ■600Ω	.1Ω	0Ω	†500Ω	†100KΩ	5600Ω ■600Ω	
V 3	6C4	†7.7KΩ	0Ω	1.8Ω	0Ω	†7.7KΩ	22KΩ	0Ω	
V 4	6BE6	22KΩ	220Ω	1.8Ω	0Ω	†11KΩ	†35KΩ	.1Ω	
V 5	6BE6	22KΩ	.2Ω	0Ω	.1Ω	†2.8KΩ	†100KΩ	.1Ω	
V 6	6SG7	0Ω	0Ω	5600Ω ■600Ω	3.5Meg ¶500KΩ	5600Ω ■600Ω	†50KΩ	.1Ω	†2.8KΩ
V 7	6SG7	0Ω	0Ω	5400Ω ■400Ω	3.5Meg ¶500KΩ	5400Ω ■400Ω	†50KΩ	.1Ω	†3KΩ
V 8	6SG7	0Ω	0Ω	5200Ω ■150Ω	3.5Meg ¶500KΩ	5200Ω ■150Ω	†50KΩ	.1Ω	†2.8KΩ
V 9	6SJ7	0Ω	0Ω	0Ω	22KΩ	.8Ω	100KΩ	.1Ω	#†150KΩ
V 10	6H6	0Ω	0Ω	1.5Meg ¶750KΩ	33Ω	120KΩ ‡220KΩ	INF	1.8Ω	0Ω
V 11	6H6	0Ω	0Ω	1.1Meg ‡260KΩ	220KΩ ‡480KΩ	1.25Meg ‡470KΩ	1.6Meg ‡700KΩ	2Ω	220KΩ ‡480KΩ
V 12	6SJ7	0Ω	0Ω	2.4KΩ	25Ω	2.4KΩ	†600KΩ	.1Ω	†150KΩ
V 13	6SN7GT	3 Meg ¶0Ω	†50KΩ	1KΩ	270KΩ	†50KΩ	52KΩ	0Ω	.1Ω
V 14	6V6GT	0Ω	0Ω	†180Ω	†300Ω	220KΩ	INF	.1Ω	213Ω
V 15	6V6GT	0Ω	0Ω	†160Ω	†300Ω	200KΩ	†160Ω	.1Ω	213Ω
V 16	5V4G	INF	100KΩ	INF	115Ω	INF	120Ω	INF	100KΩ
V 17	0B2	†7KΩ	0Ω	INF	0Ω	†7KΩ	†54KΩ	0Ω	
V 18	4H-4	INF	.7Ω	INF	INF	INF	INF	1.5Ω	INF

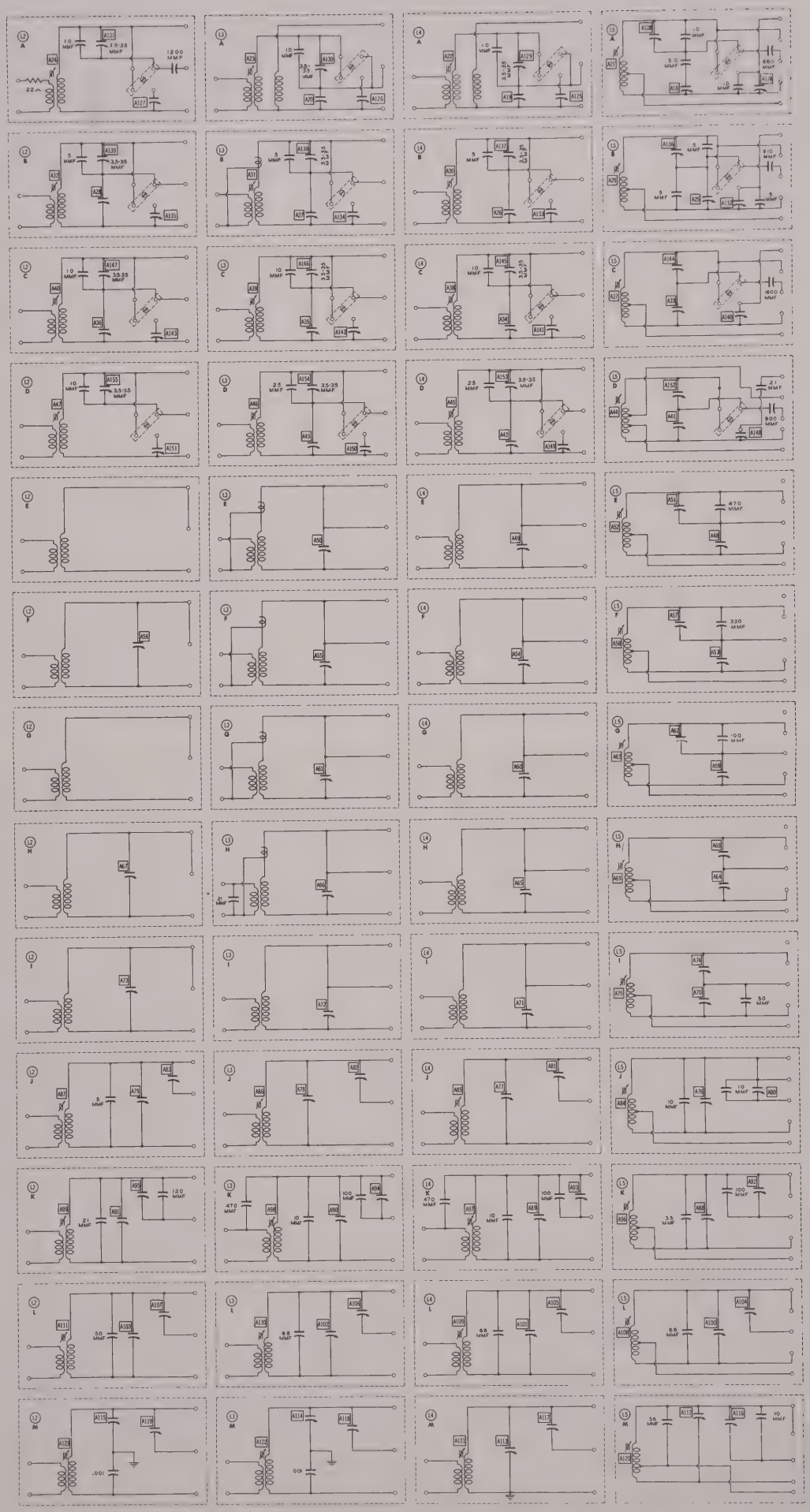
FUNCTION SWITCH IN "AM" POSITION UNLESS NOTED
LIMITER IN "OFF" POSITION UNLESS NOTED
B+ SWITCH IN "ON" POSITION
CALIBRATE SWITCH IN "OFF" POSITION
AVC SWITCH IN "ON" POSITION UNLESS NOTED
RF GAIN CONTROL FULLY COUNTERCLOCKWISE UNLESS NOTED
† MEASURED FROM PIN 2 OF V16
# FUNCTION SWITCH IN "CW" POSITION
¶ AVC SWITCH IN "OFF" POSITION
‡ LIMITER SWITCH IN "ON" POSITION FULLY CLOCKWISE
■ RF GAIN CONTROL AT ZERO

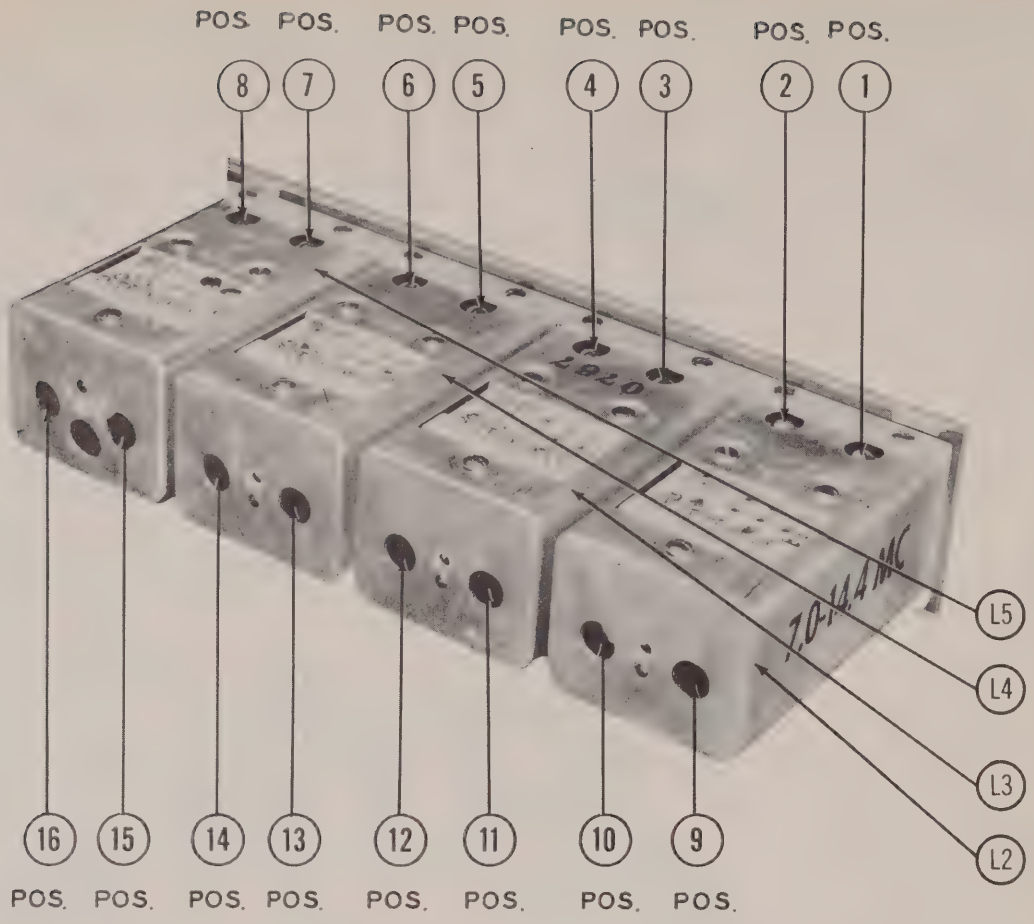




1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953





PLUG-IN COIL SET

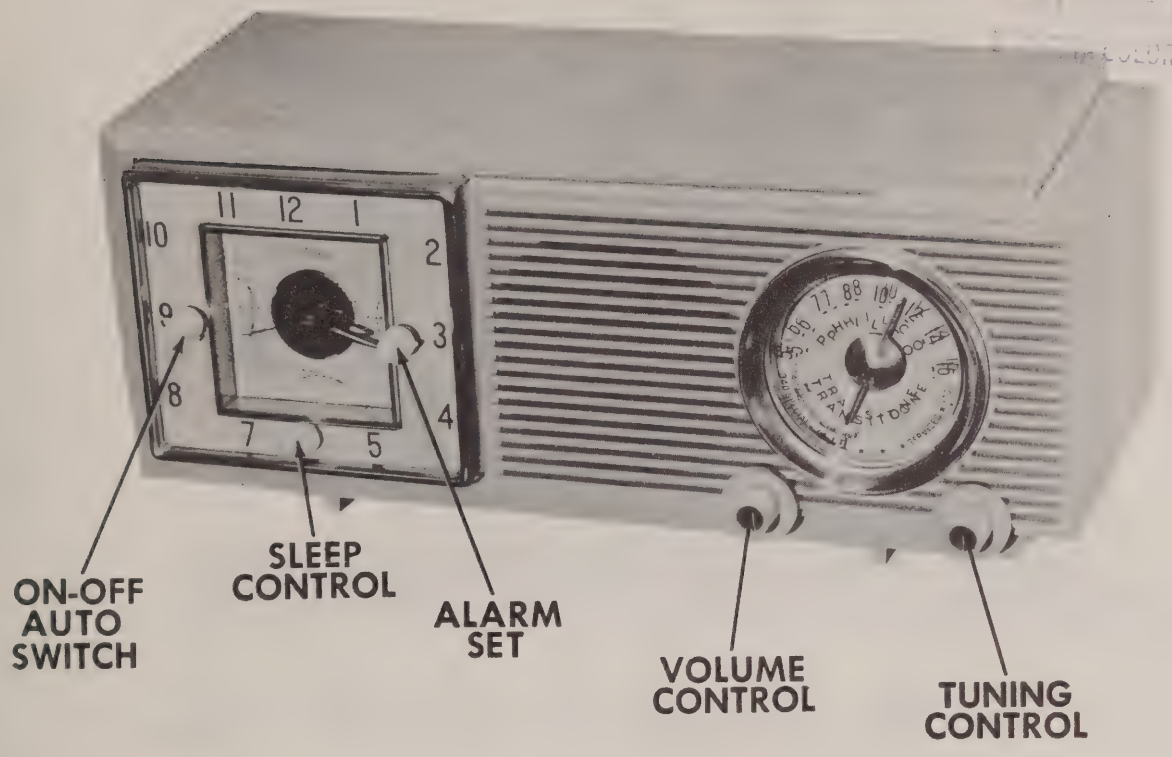
NOTE: INDUCTANCE ADJUSTMENTS AT POSITION NO. 16 ARE AS FOLLOWS:

1. A, B & C Coil Sets --- Loop of wire inside coil form -- bending the loop one way or the other adds or subtracts to the inductance.
2. D Coil Set --- Adjustable disc inside coil form --- moving the disc toward the center of the coil decreases inductance.
3. E, F, G, H & J Coil Sets --- A short-circuited turn of wire around the outside of the coil --- moving this turn up or down varies the inductance.

Inductance adjustment at position Nos. 9, 11 & 13 of coil sets A, B, C, D, AA, AB, AC & AD is a loop of wire inside coil form --- bending the loop one way or the other varies the inductance.

PROPERTY OF
L. F. BLANKENSHIP
[illegible] ST.
[illegible] COLORADO

PHILCO
MODELS 53-702, 53-706, 53-707



PHILCO
MODELS 53-702, 53-706, 53-707

PHILCO MODEL 53-702

TRADE NAME	Philco Models 53-702, 53-706, 53-707
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pennsylvania
TYPE SET	AC Operated Two Band AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det-AVC-AF Amp., 35C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620 KC
SPECIAL SERVICES	1700-3400KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BA6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	Turn tuning gang .006 inch from fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	1500KC	"	A6	"
4.		"	3200KC	3200KC	"	A7	"

IN MODELS 53-706, 53-707, THE TUNING CONTROL IS LOCATED BETWEEN THE SPEAKER AND THE TUNING CAPACITOR.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	35C5	35C5	7S	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	30	150	30-2573	PRS150/30-30-30		EDL32V215		3N534	TVA-3444	Orange
B	25	150								Red
C	20	150								Blue
C2	944	500	30-1220-65							
C3	47		30-1230-4	SI47	D6-470	5W5Q5	GP1K-470	UC-5447	5GA-Q47	
C4	7.5		30-1224-83							
C5	.05	200	30-4650-45	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C6	220	500	62-122001001	1468-00025	D6-221	5W5T25	GP2K-221		1FM-325	
C7	.05	200	30-4650-45	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C8	5000		30-1238-1	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C9A	.005		♦30-6001		♦PC-70		♦1406-01		♦104C4	
B	250									
C										
C10	.022	400	30-4650-43	P488-022		PTE4S22		PT4122	4TM-S22	
C11	.047	400	30-4650-45	489ZX-05		PJ4S5		PT4147	4TM-S47	
C12	.1	400	30-4650-47	P488-1		PTE4P1		PT401	4TM-P1	

♦ Items C9A, C9B, C9C, R7A, R7B are combined in one unit.
When replacing items separately, C9B and C9C should total 250MMF

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	33-5565	Q13-133	AG-60-Z	B-60	U-48	Volume-Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

Note . Model No. 706 uses alternate control part No. 33-5565-50. Model No. 707 uses alternate control part No. 33-5566-49.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	NOTES
R2	22KΩ	½	66-3228340	BTS-22K	
R3	4700Ω	½	66-2478340	BTS-4700	
R4	2.2Meg	½	66-5228340	BTS-2.2Meg	
R5	47KΩ	½	66-3478340	BTS-47K	
R6	10 Meg	½	66-6108340	BTS-10 Meg	
R7A	500KΩ	½	♦ 30-6001		
B	500KΩ	½			

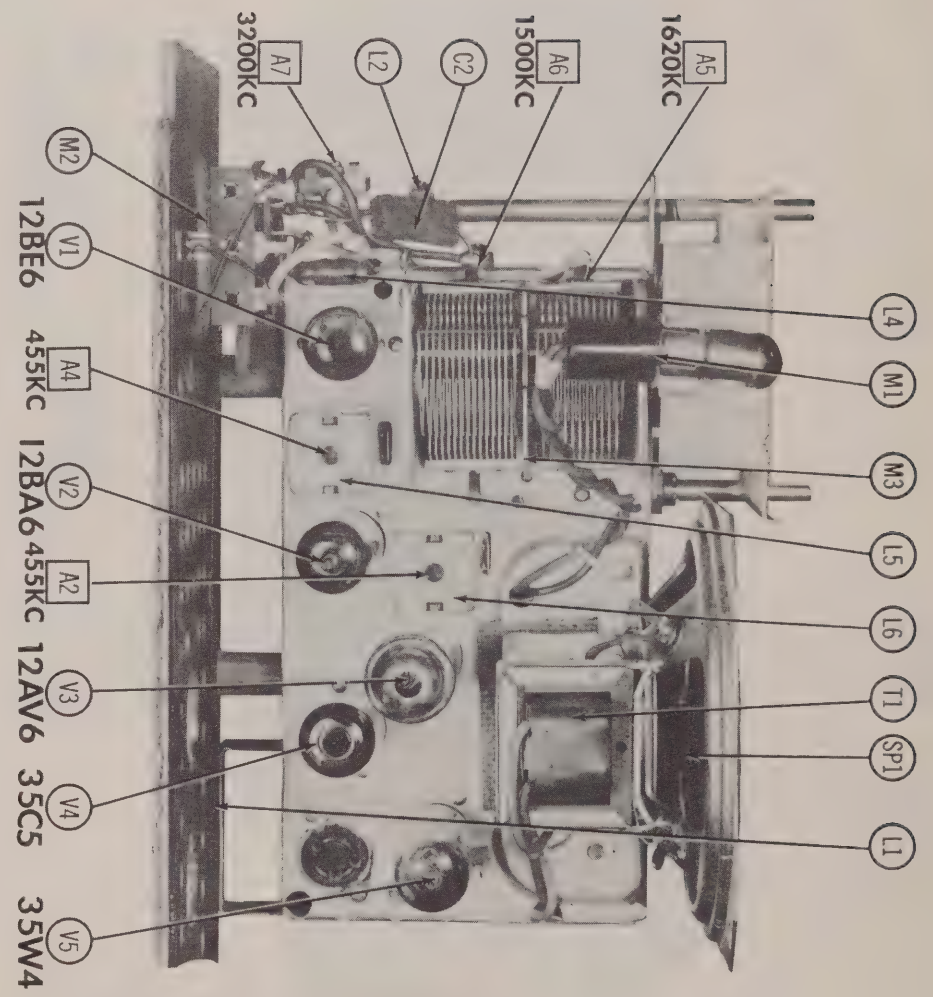
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	NOTES
R8	150Ω	½	66-1158340	BTS-150	
R9	220Ω	1	66-1224340	BTA-220	
R10	1000Ω	½	66-2108340	BTS-1000	
R11	*	*	33-1343-3		

* Special resistor-measures 100Ω Hot, 880Ω Cold.
♦ Items R7A, R7B, C9A, C9B, C9C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T1	2.7KΩ	3.4Ω	220Ω	.8Ω	32-8384	A-3332 ①	A-3025 ①	RO-301 ①	S-1X ①	① Bend mtg. tabs down, file out slots. Mount on original mtg. bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	36-1627-23	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	PHILCO PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Loop Ant.	3.4Ω		76-7807-1 *			Includes cabinet back (Beige)
L2	SW Ant. Coil	1.1Ω		32-4561-3			
L3	BC Osc. Coil	1.2Ω	7Ω	32-4453-6	70-Osc.	14-1073	
L4	SW Osc. Coil	3.2Ω		32-4562-2			
L5	Input IF	14.5Ω	14.5Ω	32-4161A	12-C1	16-6758	
L6	Output IF	14.5Ω	14.5Ω	32-4240A	12-C6	16-6770	

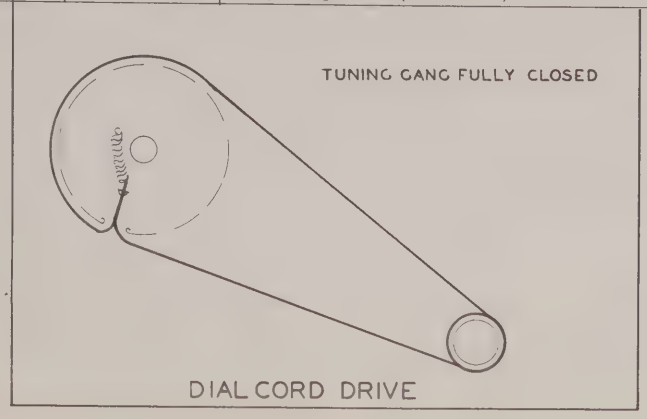
* Part No. used in Model 53-702 only: Part No. 76-7807 used in Model 702 for Maroon cabinet back & loop assembly. Model 53-706 uses part No. 768004 and Model 53-709 uses part No. 76-8004 in this application.

DIAL LIGHTS

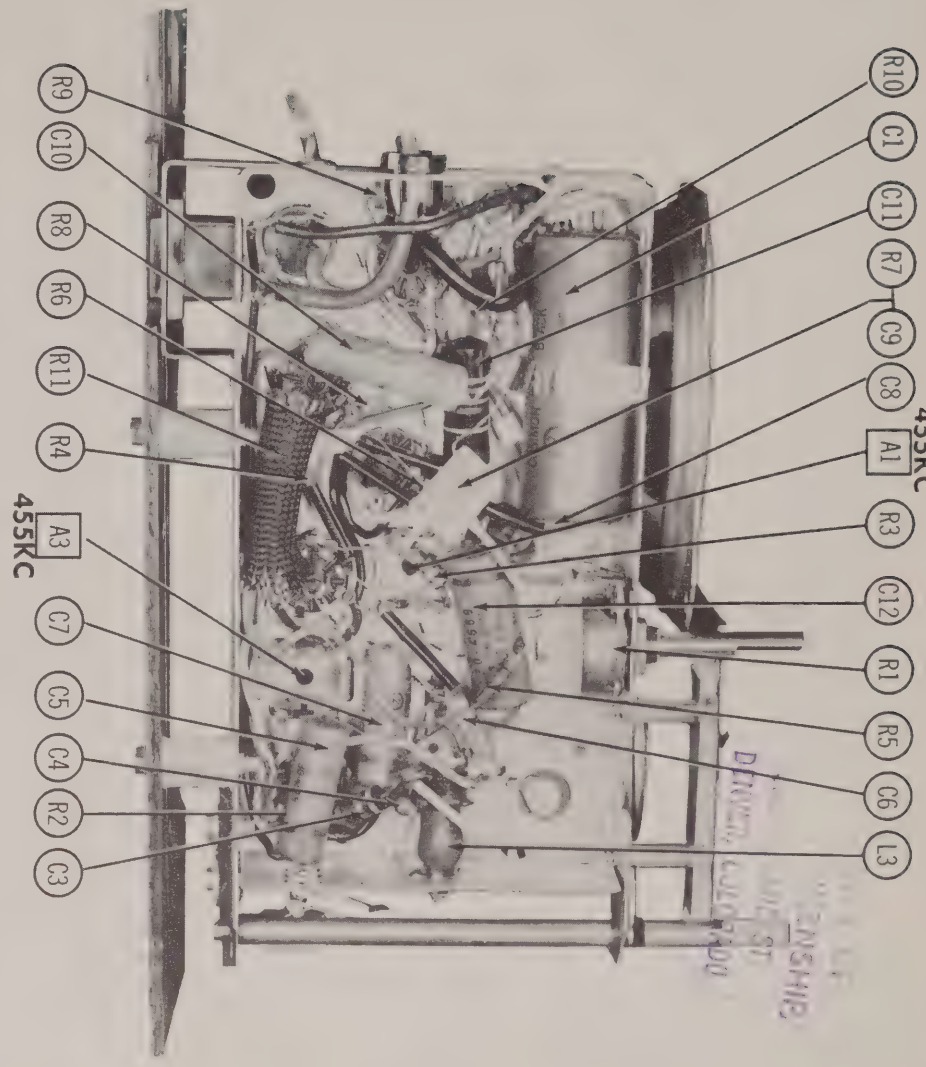
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					PHILCO PART No.		
M1	Bayonet	6-8	.15	Brown	34-2068		Type #47

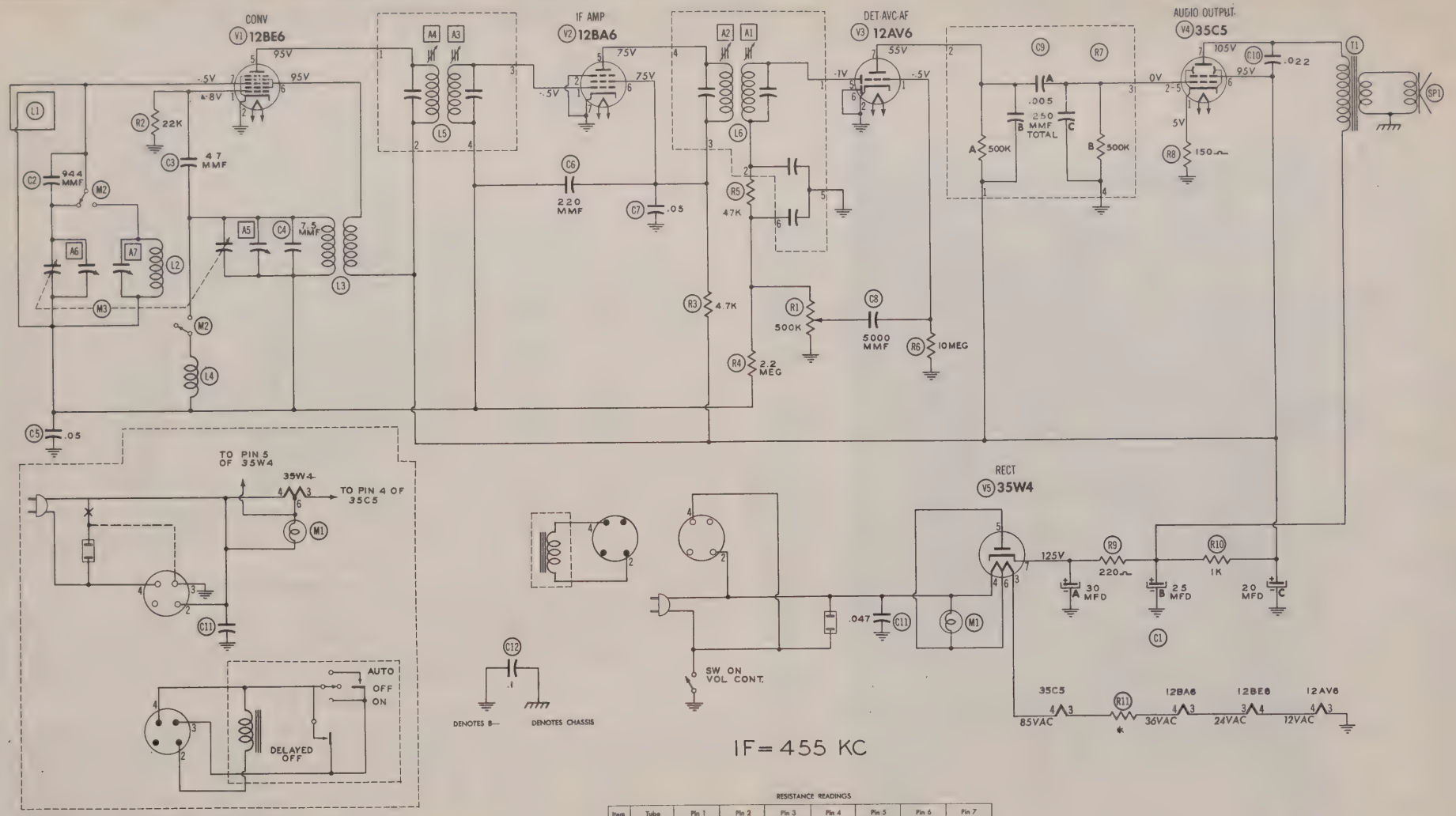
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2	Switch	42-1796-2	Broadcast & Special Services
M3	Tuning Capacitor	31-2751-14	14-483MMF, 9-170MMF
A7	Trimmer	31-6473-29	Special Services Ant.
	Cabinet	10940	Maroon (Model 53-702)
	Cabinet	10940-2	Beige (Model 53-702)
	Cabinet	10952	Mahogany (Model 53706)
	Cabinet	10952-1	Blond (Model 53706)
	Cabinet	10953	Model 53-707
	Knob	54-4983	Maroon, Clock (3), (Model 53-702)
	Knob	54-4986	Maroon, Tuning-Volume (Model 53-702)
	Knob	54-4983	Beige, Clock (3) (Model 53-702)
	Knob	54-4986-1	Beige, Tuning-Volume (Model 53-702)
	Knob	54-4983-3	Mahogany, Clock (3) (Models 53-706, 53-707)
	Knob	54-4557-6	Mahogany, Tuning-Volume (Models 53-706, 53-707)
	Knob	54-4983-3	Blond, Clock (3) (Model 53-706)
	Knob	54-4557-7	Blond, Tuning-Volume (Model 53-706)



CHASSIS—BOTTOM VIEW





ALTERNATE CLOCK CIRCUIT USED IN MODELS 53-706 & 53-702 ONLY

IF = 455 KC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	0Ω	24Ω	12Ω	†1.2KΩ	†1.2KΩ	2.7 Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	†5.9KΩ	†5.9KΩ	0Ω
V 3	12AV6	10 Meg	0Ω	0Ω	12Ω	550KΩ	0Ω	†500KΩ
V 4	35C5	150Ω	500KΩ	916Ω	951Ω	500KΩ	†1.2KΩ	†440Ω
V 5	35W4	†220Ω	†220Ω	951Ω	986Ω	980Ω	980Ω	120KΩ

† MEASURED FROM PIN 7 OF V5
▲ TAKEN WITH VACUUM TUBE VOLTMETER

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1953

202-5

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
L. F. [illegible]
[illegible]

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)

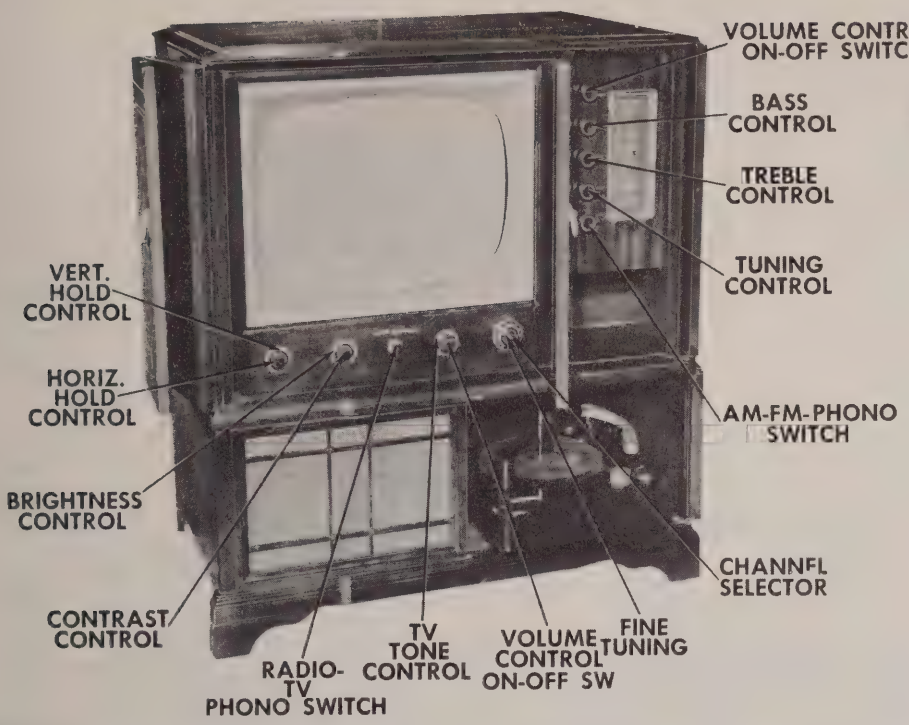
MODEL 21-T-242

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 5-53 SET 202 FOLDER 6

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)



RCA VICTOR MODEL 21-T-244

TRADE NAME	RCA Victor Models 21-T-242 (TV Ch. KCS72D-1, Radio Ch. 1117B), 21-T-244 (TV Ch. KCS72D-2, Radio Ch. RC1111B, Audio Output Ch. RS141C)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	TV-Radio-Phono Combination Receiver
TUBES	Thirty-nine
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.92 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 25.5MC, TV Sound 21MC, FM 88-108, FM IF 10.7MC, AM 540-1620KC, AM IF 455KC

FOR SERVICE INFORMATION ON RECORD CHANGER, SEE V-M MODEL 950, PHOTOFACT SET 107, FOLDER 13, ALSO SUPPLEMENT SET 131, FOLDER 17 OR RECORD CHANGER MANUAL CM-3.

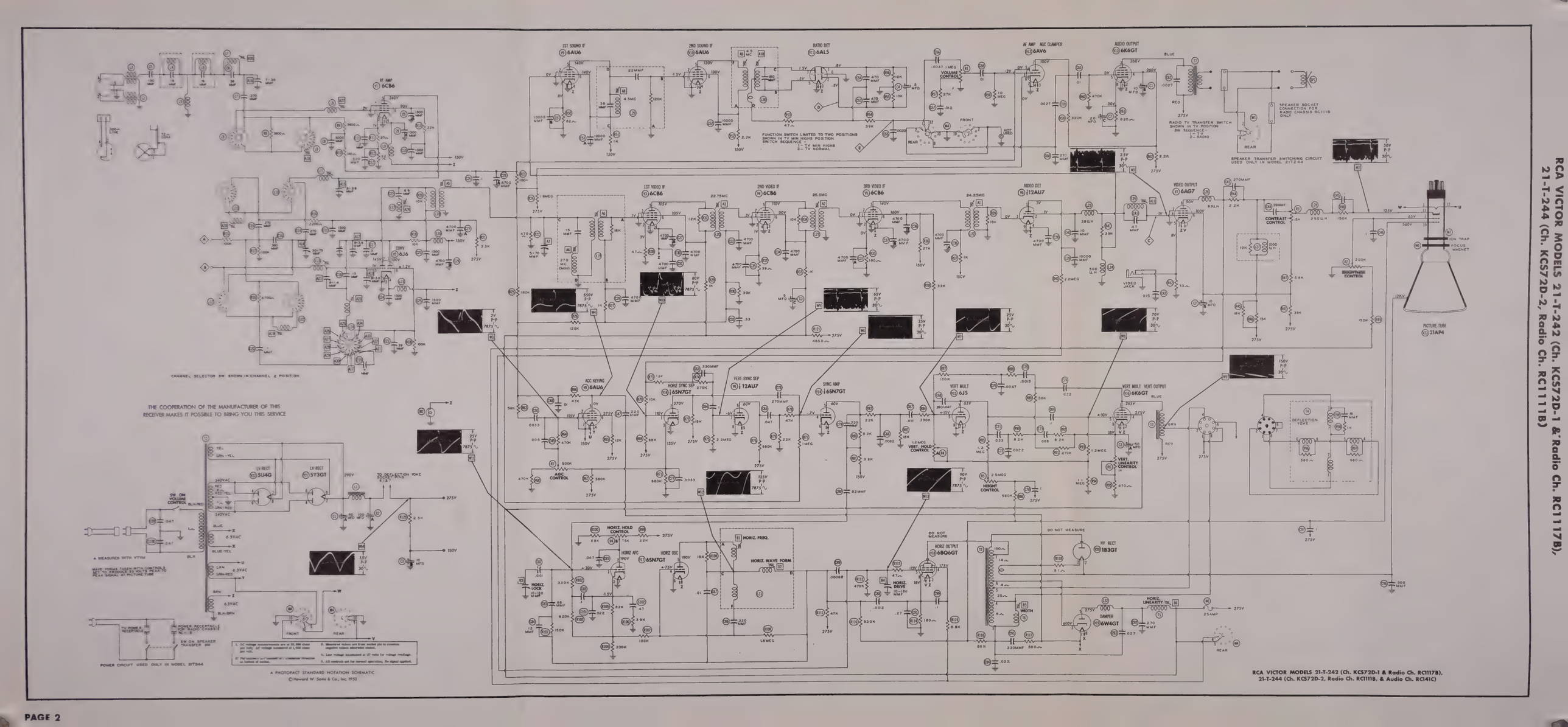
INDEX

Alignment Instructions (Radios) 13
Alignment Instructions (TV) 6, 7
Drive Cord Stringing (Radios) 30
Disassembly Instructions 31
Horiz. Sweep Circuit Adjustment 11
Parts List and Descriptions (Radios) 14, 15
Parts List and Descriptions (TV) 23, 24, 25
Photographs
AM Radio Chassis-Top & Bottom Views 18
Cabinet - Rear View 11
Capacitor & Alignment Identification (TV) .. 4, 9
Chassis - Bottom View (AM-FM Radio) 28
Chassis -Top View (AM-FM Radio) 21
Chassis -Top View (TV) 3
Photographs (Cont)
High Voltage Compartment 21
RF Tuner 10
Radio Power Chassis-Top & Bottom Views 19
Resistor and Inductor Identification 22, 27
Resistance Measurements 8
Servicing in the Field 26
Schematic (AM Radio) 16
Schematic (AM-FM Radio) 12, 17
Schematic (TV) 2
Trouble Shooting Aids 20, 29
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

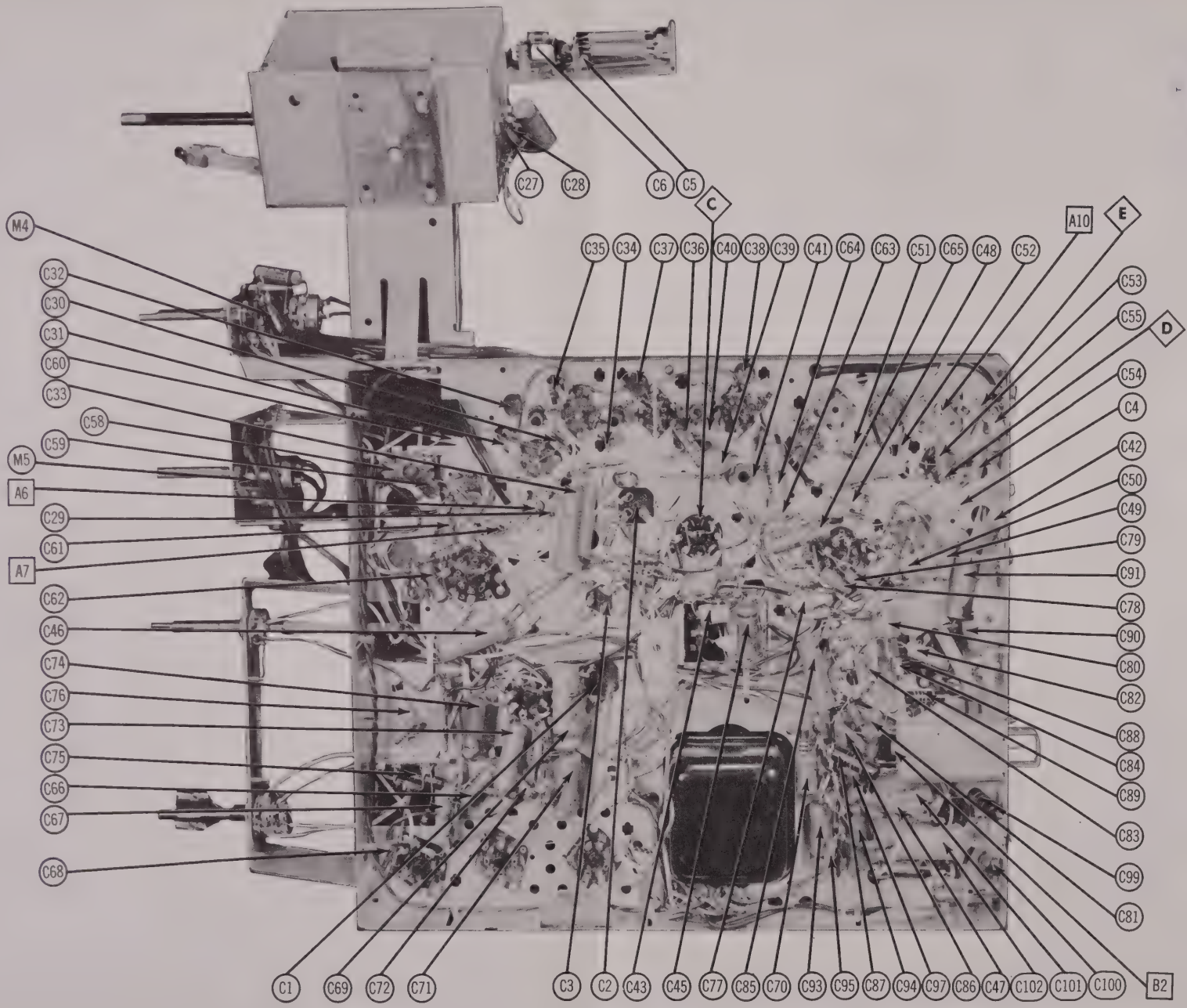
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


RF AMP V7 6CB6
1ST SOUND IF V8 6AU6
2ND SOUND IF V10 6AU6
RATIO DET V11 6AL5
AF AMP AGC CLAMPER V12 6AV6
AUDIO OUTPUT V13 6K6GT
1ST VIDEO IF V15 6CB6
2ND VIDEO IF V14 6CB6
3RD VIDEO IF V15 6CB6
VIDEO DET V16 ½12AU7
VIDEO OUTPUT V17 6AG7
ACC KEYING V18 6AU6
HORIZ SYNC SEP V19 ½6SN7GT
VERT SYNC SEP V16 ½12AU7
SYNC AMP V19 ½6SN7GT
VERT MULT V21 6J5
VERT MULT VERT OUTPUT V18 6K6GT
HORIZ AFC V17 ½6SN7GT
HORIZ OSC ½6SN7GT
HORIZ OUTPUT V19 6BQ6GT
HV RECT V20 1B3GT
DAMPER V13 6W4GT
LV RECT V20 5U4G
LV RECT V21 5Y3GT
PICTURE TUBE V22 21AP4
CHANNEL SELECTOR SW SHOWN IN CHANNEL 2 POSITION
FUNCTION SWITCH LIMITED TO TWO POSITIONS SHOWN IN TV MIN HIGHS POSITION
SWITCH SEQUENCE
1 – TV MIN HIGHS
2 – TV NORMAL
RADIO TV TRANSFER SWITCH SHOWN IN TV POSITION
SW SEQUENCE –
1 – TV
2 – RADIO
SPEAKER SOCKET CONNECTION FOR RADIO CHASSIS RC1111B ONLY
SPEAKER TRANSFER SWITCHING CIRCUIT USED ONLY IN MODEL 21T244
VOLUME CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
HEIGHT CONTROL
VERT. HOLD CONTROL
VERT. LINEARITY CONTROL
HORIZ. HOLD CONTROL
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ. DRIVE
HORIZ. LOCK
WIDTH
HORIZ. LINEARITY
AGC CONTROL
ION TRAP MAGNET
FOCUS MAGNET
DEFLECTION YOKE
DO NOT MEASURE
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
SW ON VOLUME CONTROL
SW ON SPEAKER NUMBER 2W
TV POWER RECEPTACLE
POWER RECEPTACLE FOR RADIO CHASSIS RC-1111B
POWER CIRCUIT USED ONLY IN MODEL 21T244
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
A MEASURED WITH VTVM
1. DC voltage measurements are at 20,000 ohms per volt; AC voltage measured at 1,000 ohms per volt.
2. Measured values are from socket pin to common negative return unless otherwise stated.
3. Line voltage maintained at 117 volts for voltage readings.
4. All controls set for normal operation; No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953
RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B)

PROPERTY OF
L. F. [illegible]ENSHIP

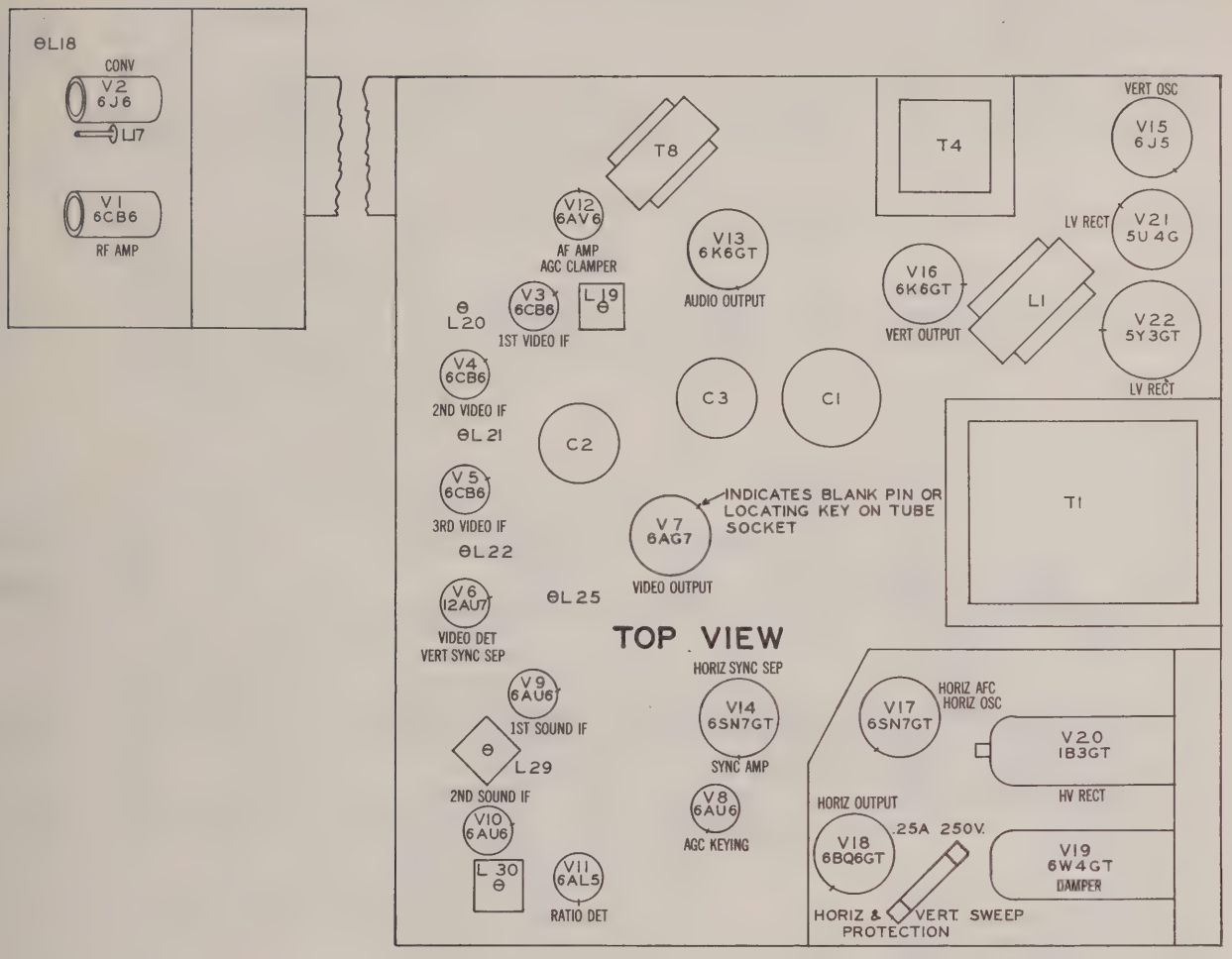
TV CHASSIS - TOP VIEW



TV CHASSIS - BOTTOM VIEW - CAPACITOR & ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

PROPERTY OF
L. F. P[illegible]



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V21, V22

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6
No pic, no sound has snow-V1, V2, V3
No pic, has sound, has raster-V7, V23
Has pic, no sound-V9, V10, V11, V12, V13
Overloaded picture-V8, V12

SYNC FAILURE
No vert. sync.-V14, V15
No horiz. sync.-V14, V17
No vert. or horiz. sync.-V6, V14

SWEEP FAILURE
No raster, has sound-V17, V18, V19, V20, V23 Fuse (M1)
No vertical deflection-V15, V16
Poor vert. linearity or foldover-V15, V16
Poor horiz. linearity or foldover-V17, V18, V19
Narrow picture-V17, V18, V19, V20, V21, V22
Vert. off freq.-V14, V15
Horiz. off freq.-V14, V17

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal multivibrator tube (V17). Connect a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding appreciable current drain. This will be a source of variable bias for use during alignment.

VIDEO IF ALIGNMENT

Connect the potentiometer arm of the bias box to the junction of R26 and R30. Connect the positive lead to chassis. Adjust the potentiometer to supply -5 volts bias.
Connect a separate -5 volt bias supply to point (A) with positive lead to chassis.
Turn the AGC control fully clockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD	High side to point (E) Low side to chassis.	Not Used.	34.25MC (Unmod)	9, 10, or 11	Use VTVM. DC probe to point (C) Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator to maintain 3 Volt reading on VTVM.
2.	"	"	"	25.5MC	"	"	A2	"
3.	"	"	"	22.75MC	"	"	A3	"
4.	"	"	"	27.0MC	"	"	A4	Adjust for MINIMUM deflection. Maintain 3 Volt reading on VTVM by adjusting generator output or reducing IF bias.
5.	"	High side to point (B) using short leads. Low side to tuner chassis.	24MC (10MC Swp)	22.25MC 25.5MC 27.0MC	Between channels 3 and 13.	Vert. amp of scope thru detector (Fig.1) to pin 5 of V3. Low side to chassis.	A5, A6, A7	Preset A7 to minimum capacity. Place 330Ω carbon resistors across primaries of L21 and L22 (Pin 5 to pin 6 on V4 and V5). Connect a 180Ω carbon resistor across R31. Adjust A5 and A6 for curve of maximum amplitude with 25.5MC at 70% response as in Fig.2. Adjust A7 until 22.25MC is at 70% response. Maintain .3 volt peak to peak response on scope on above adjustments.
6.	"	"	"	22.4MC 24.75MC 25.5MC 26.25MC	"	Vert. amp to point (C) Low side to chassis.		Remove the two 330Ω resistors and the 180Ω resistor. Retouch A1, A2 and A3 for response of Fig. 3.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6AU6 (V9). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel.	DC probe to point (D) Common to chassis.	A8, A9	Adjust for maximum deflection. Maintain generator output to give 6 Volts DC at VTVM.
8.	"	"	"	"	DC probe to point (B) Common to chassis.	A10	Adjust for a zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6AU6 (V9). Low side to chassis.	4.5Mc (450KC Swp)	4.5MC	Any non-interfering channel.	Vert. amp to point (D) Low side to chassis.	A8, A9	Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as in Fig. 4.
8.	"	"	"	"	"	Vert. amp to point (E) Low side to chassis.	A10	Reconnect capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	1000Ω Resistor	High side to pin 2 (grid) of 12AU7 (V8A). Low side to chassis.	Not used.	4.5MC (400%Mod)	Any	Vert. amp thru detector (Fig. 1) to pin 8 (plate) of 6AG7 (V7). Low side to chassis.	A11	Short pin 1 of V5 to chassis to reduce noise indication on scope. Adjust A11 for MINIMUM 400% on indication on scope.

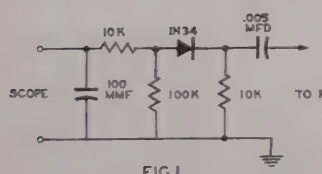


FIG.1

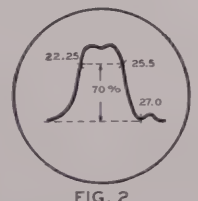


FIG. 2

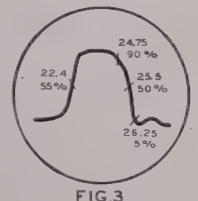


FIG.3

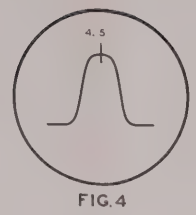


FIG.4

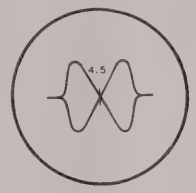


FIG. 5

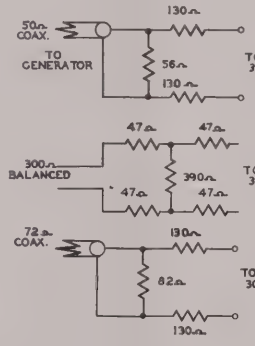


FIG.6

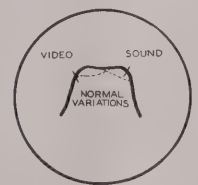
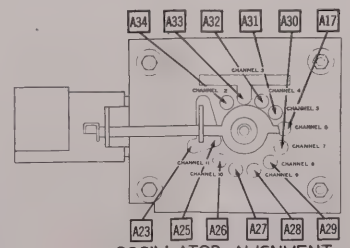


FIG. 7



OSCILLATOR ALIGNMENT POINTS

TV ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Disconnect the coax link from terminal 2 of the tuner terminal board and connect a 39 ohm carbon resistor between terminals 1 and 2.
Preset A5, A24 and A35 by backing the cores all the way out of the coils.
The bottom shield of the tuner must be in place during alignment.
Set the fine tuning control 30 degrees clockwise from the center of its range.
Alignment of the oscillator section requires the use of a crystal-calibrated heterodyne frequency meter.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
After performing step 10, connect the 7.5 volt bias box with potentiometer arm to terminal 3 of the RF tuner unit and positive to chassis.
Adjust the potentiometer for -3.5 volts bias.
Turn the AGC control fully clockwise.

PROPERTY OF [illegible] ELECTRONICS SHIP [illegible] 3224 [illegible] ST.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	None	Loosely couple the frequency meter probe to the receiver oscillator	Not used	Set freq. meter to 236.75MC	13	Not used	A12	Adjust for audible beat on frequency meter.
11.	Fig. 6	Through dummy to antenna terminals	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point (A). Low side to chassis.	A13, A14, A15, A16	Adjust for response similar to Fig.7.
12.	None	Frequency meter as in step 10.	Not used	Set freq. meter to 108.75MC	6	Not used	A17	Adjust for audible beat on frequency meter.
13.	Fig. 6	Through dummy to antenna terminals	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point (A). Low side to chassis.	A18, A19, A20	Adjust for response similar to Fig. 7.
14.	"	"	"	"	"	"	A21	Connect VTVM to point A. Adjust A21 for -3 volts at point A. If necessary retouch A18, A19 and A20 for proper response as in Fig. 7. If necessary retouch A14 for proper bandwidth on channel 6. Repeat retouching adjustments until proper response is obtained and -3 volts are present at VTVM.
15.	None	Frequency meter as in step 10.	Not used	Set freq. meter to 206.75MC	8	Not used		Readjust A12 for audible beat on frequency meter.
16.	Fig. 6	Through dummy to antenna terminals	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point (A). Low side to chassis.		Readjust A13, A15 and A16 for response similar to Fig. 7. Retouch A14 only if necessary.
17.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13		A22 A16	Adjust for maximum amplitude of curve between markers. Overshoot the adjustment slightly, in same direction as required to reach maximum from original setting. Adjust A16 for maximum amplitude of response.
18.	None	Frequency meter as in step 10.	Not used	Set freq. meter to 236.75MC	"	Not used	A23	Adjust for audible beat on frequency meter then overshoot the adjustment in same direction from initial setting. Readjust A12 for audible beat on frequency meter.
19.	Fig. 6	Through dummy to antenna terminals	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.		Check for response similar to Fig.7 with markers above 80%. If markers fall below 80%, switch to channel 8 and readjust A13 thru A16 as necessary. If A16 requires readjustment, the adjustment should be overshot a small amount and corrected by adjustment of A22 to give maximum response between the markers. If the dip in the middle of the response curve is too great it can be flattened by turning A24 clockwise. If A24 is adjusted check channels 7 and 8 for any undesired trap action.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
20.	None	Frequency meter as in step 10.	Not used	Set freq. meter to 206.75MC	8	Not used		Check oscillator setting. If necessary adjust A12, overshoot the adjustment and correct by adjusting A23.
21.		Repeat Step 12.						
22.		Repeat Step 13.						
23.	With VTVM at point A check oscillator injection voltage on channel 6. Adjust A21 for -3 volts, if necessary. If A21 is adjusted switch to channel 8 and readjust A13 for proper curve shape, then recheck channel 6.							
24.	None	Frequency meter as in step 10.	Not used	236.75MC	13	Not used	A12	Adjust for audible beat on frequency meter.
				230.75MC	12		A25	
				224.75MC	11		A26	
				218.75MC	10		A27	
				212.75MC	9		A28	
				206.75MC	8		A29	
				200.75MC	7		A30	
				108.75MC	6		A17	
				102.75MC	5		A31	
				92.75MC	4		A32	
				85.75MC	3		A33	
				80.75MC	2		A34	
25.	Fig. 6	Through dummy to antenna terminals.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point (A). Low side to chassis.	A5	Adjust in clockwise direction to point of maximum bandwidth. Remove 39Ω resistor, reconnect coax link to tuner and repeat step 6 adjustments if necessary.

FM TRAP ADJUSTMENT

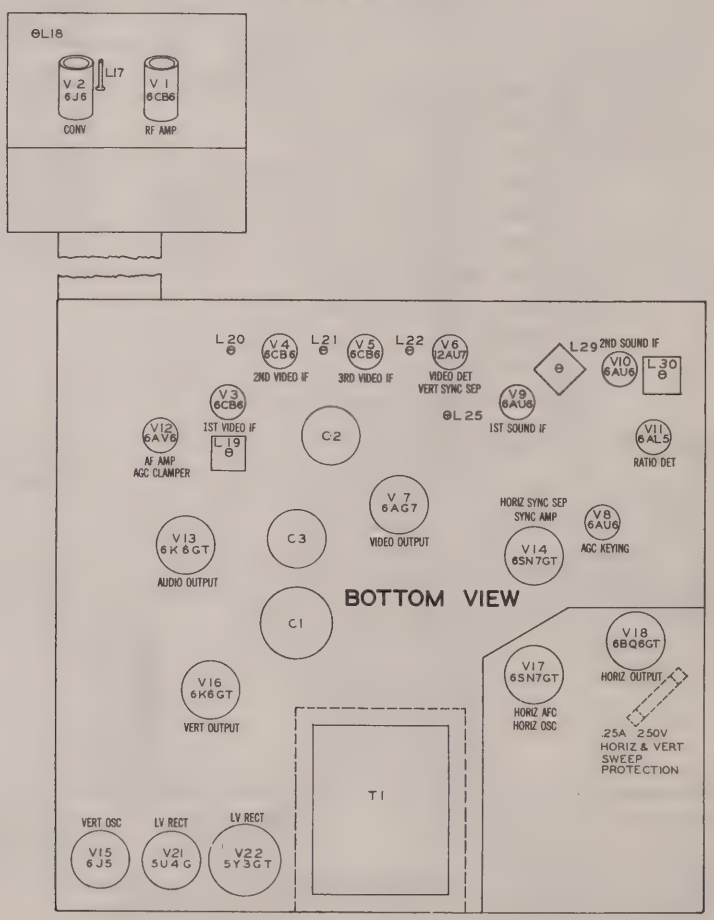
Tune in any TV station on which FM interference is noted and adjust A35 for minimum interference.

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B)

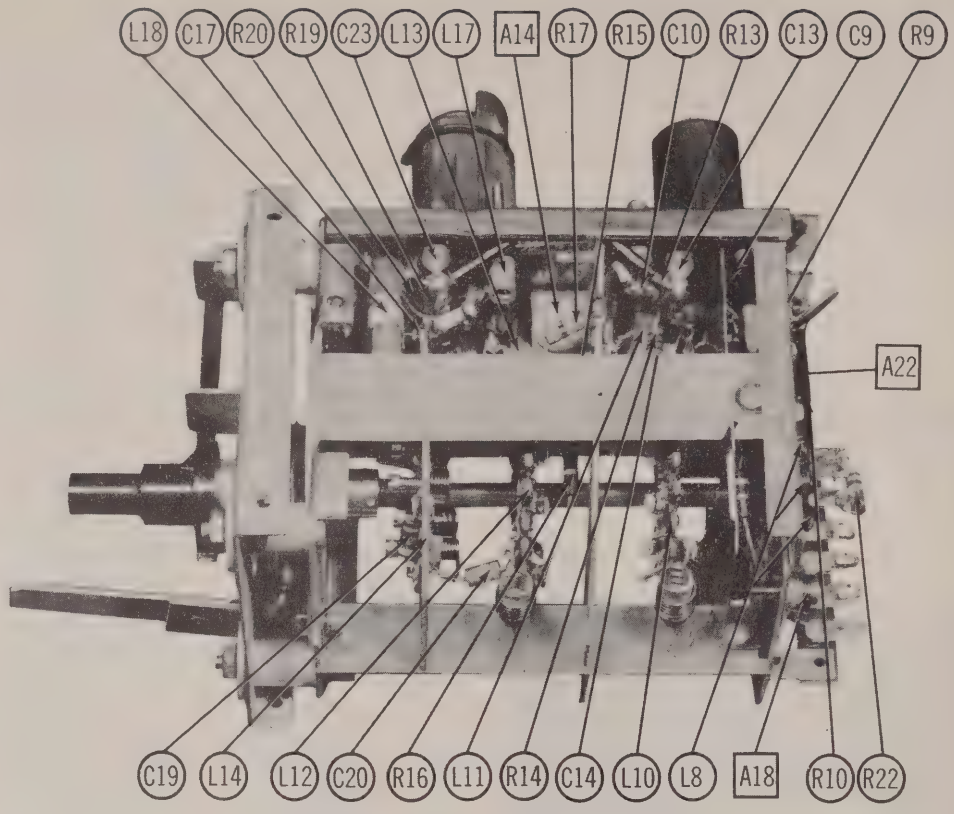
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	400KΩ	89Ω	0Ω	.1Ω	†5.5KΩ	†25KΩ	0Ω		
V 2	6J6	†13.3KΩ	†3.3KΩ	0Ω	.1Ω	100KΩ	100KΩ	0Ω		
V 3	6CB6	40KΩ	47Ω	0Ω	.1Ω	†5.6K Ω	†5.6KΩ	0Ω		
V 4	6CB6	39KΩ	39Ω	.1Ω	0Ω	†5.6KΩ	†5.6KΩ	0Ω		
V 5	6CB6	.4Ω	180Ω	.1Ω	0Ω	†3.5KΩ	†16KΩ	0Ω		
V 6	12AU7	2.7Meg	3.9KΩ	.4Ω	.1Ω	.1Ω	†700KΩ	2.2Meg	0Ω	0Ω
V 7	6AG7	0Ω	.1Ω	0Ω	3.9KΩ	33Ω	†16KΩ	0Ω	†8KΩ	
V 8	6AU6	650KΩ	†2.5KΩ	¶0Ω	¶.1Ω	200KΩ	†12KΩ	†2.5KΩ		
V 9	6AU6	11.5Ω	0Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	82Ω		
V 10	6AU6	120KΩ	0Ω	0Ω	.1Ω	†4.7KΩ	†4.7KΩ	0Ω		
V 11	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	10 Meg	0Ω	.1Ω	0Ω	400KΩ	300KΩ	†330KΩ		
V 13	6K6GT	INF	.1Ω	†2.5KΩ	†2.2KΩ	470KΩ	†3.3KΩ	0Ω	820Ω	
V 14	6SN7GT	†14 KΩ	†15KΩ	†240KΩ	70KΩ	†15KΩ	0Ω	0Ω	.1Ω	
V 15	6J5	0Ω	0Ω	#4 Meg	#3Meg	1.6Meg	INF	.1Ω	0Ω	
V 16	6K6GT	INF	.1Ω	†520KΩ	†40Ω	2.3Meg	1.1Meg	0Ω	850Ω	
V 17	6SN7GT	1.5Meg	†35KΩ	410KΩ	380KΩ	†47KΩ	0Ω	0Ω	.1Ω	
V 18	6BQ6GT	INF	.1Ω	INF	†6.8KΩ	470KΩ	2.7Meg	0Ω	180Ω	Top Cap #14Ω
V 19	6W4GT	INF	INF	800KΩ	INF	†60Ω	INF	#29Ω	#29Ω	
V 20	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap #165Ω
V 21	5U4G	INF	35KΩ	INF	17Ω	INF	18Ω	INF	35KΩ	
V 22	5Y3GT	INF	35KΩ	INF	17Ω	INF	18Ω	INF	35KΩ	
V 23	21AP4	¶.1Ω	80KΩ	Pin 10 #56KΩ	Pin 11 †155KΩ	Pin 12 ¶0Ω				

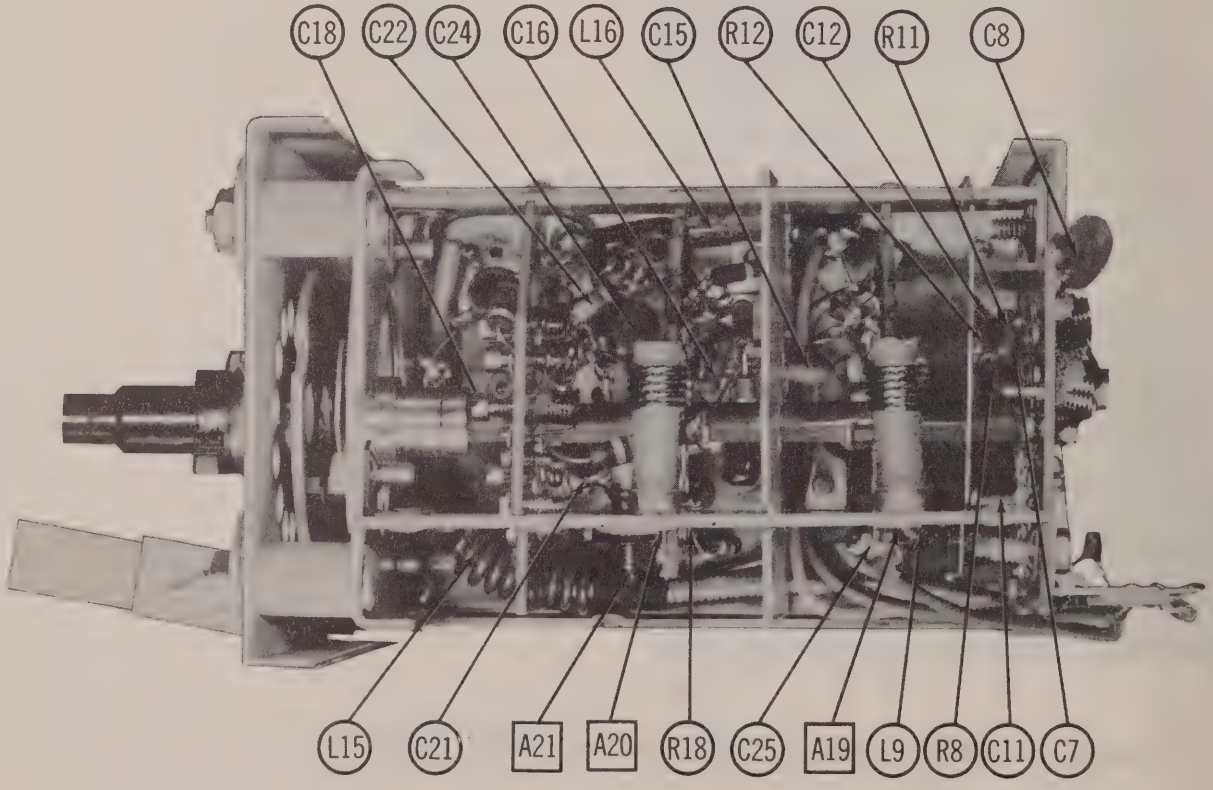
† MEASURED FROM PIN 8 OF V22
# MEASURED FROM PIN 3 OF V19



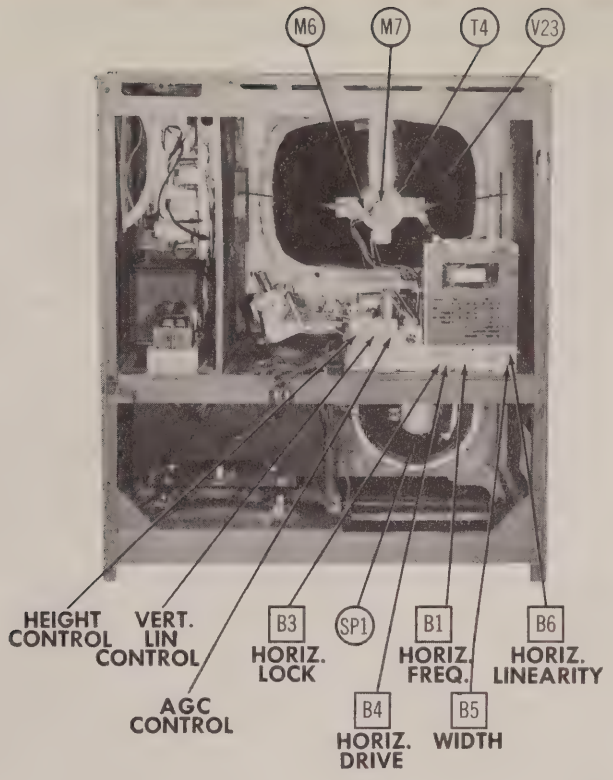
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If the picture cannot be made to synchronize with the horizontal hold control set the control to the middle of its range and adjust the horizontal frequency slug (B1) for synchronization.

If still unable to obtain satisfactory horizontal sync it may be necessary to adjust the waveform slug (B2).

Connect the low capacity probe of an oscilloscope to terminal C of L31 and view the waveform.

Turn the horizontal hold control 1/4 turn from clockwise so that the picture is in sync.

Adjust B2 until the broad and narrow peaks are of equal height as in Fig. 8. If necessary, keep the picture in sync during adjustment by adjusting the horizontal hold.

HORIZONTAL LOCKING RANGE ADJUSTMENT

Set the horizontal hold control fully counter clockwise.

Momentarily remove the signal by switching to another channel and back. If the picture is in sync, turn B1 slightly and remove the signal as before. Repeat until the picture falls out of sync with diagonal bars sloping down to the left.

Slowly turn the horizontal hold clockwise and note the least number of bars present just before the picture falls into sync.

If more than 3 bars are present adjust the horizontal locking range trimmer (B3) clockwise.

If less than 2 bars are present adjust B3 counter clockwise. Adjust B3 until 2 or 3 bars are present at the pull in point.

Turn the horizontal hold control fully clockwise.

Adjust B1 so that a diagonal bar appears, sloping down to the right. Reverse the adjustment until the bar moves off the screen, leaving the picture in sync.

Adjust the horizontal drive trimmer (B4) counter clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B5) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B6) for a picture that is symmetrical from left to right.

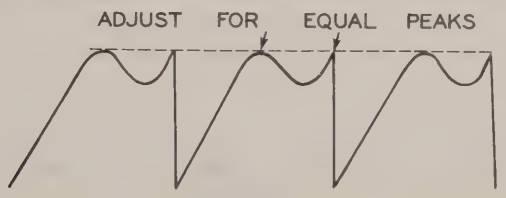
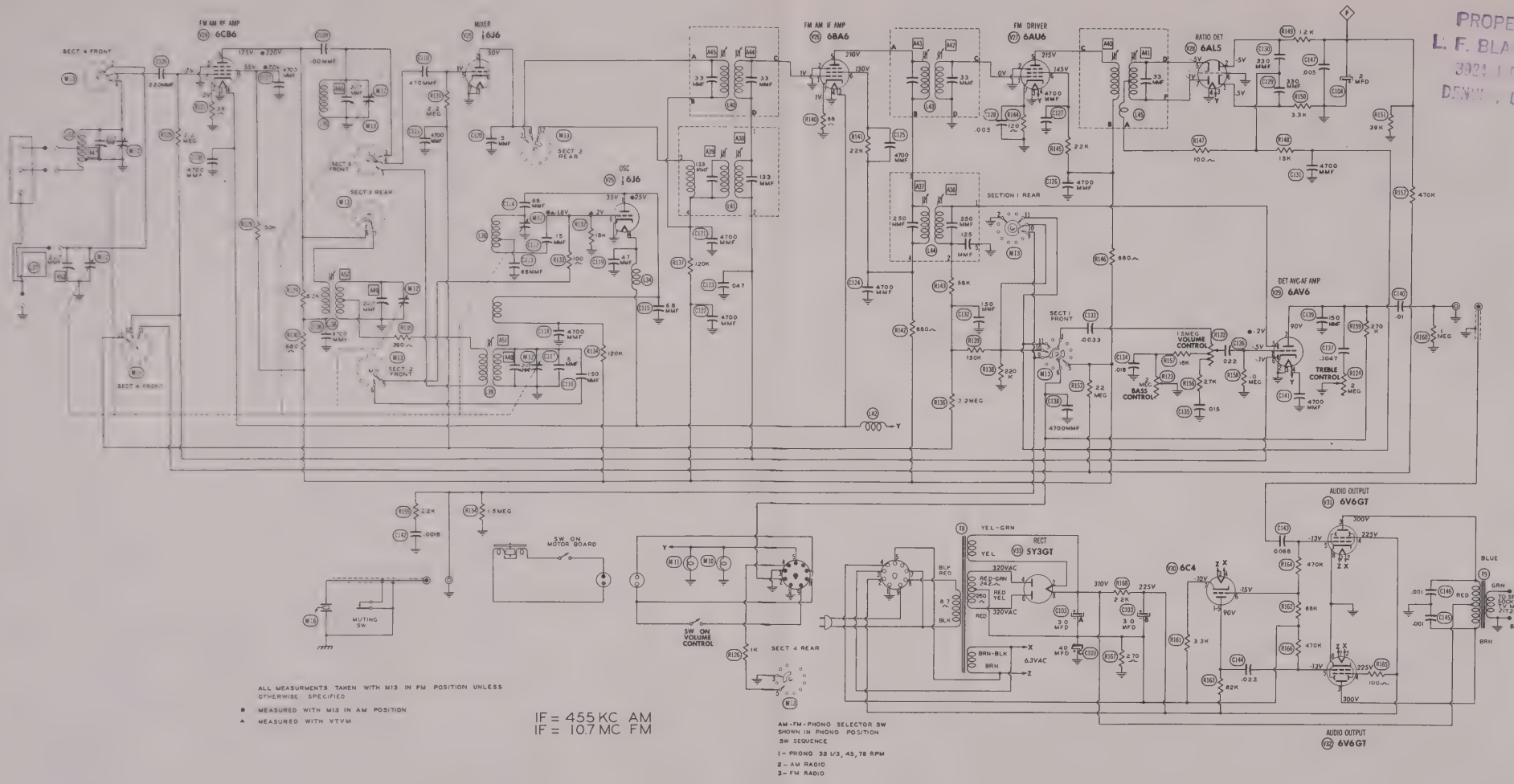


FIG. 8

PROPERTY OF
L. F. BLA[illegible]SHIP
3924 [illegible]EADE ST.
DENV[illegible], COLORADO


FM AM RF AMP V24 6CB6
MIXER V25 6J6
OSC V25 6J6
FM AM IF AMP V26 6BA6
FM DRIVER V27 6AU6
RATIO DET V28 6AL5
DET AVC-AF AMP V29 6AV6
AUDIO OUTPUT V31 6V6GT
AUDIO OUTPUT V32 6V6GT
RECT V33 5Y3GT
V30 6C4
SECT 4 FRONT
SECT 3 REAR
SECT 2 REAR
SECT 3 FRONT
SECT 2 FRONT
SECT 4 REAR
SECTION 1 REAR
SECT 1 FRONT
VOLUME CONTROL
BASS CONTROL
TREBLE CONTROL
SW ON MOTOR BOARD
SW ON VOLUME CONTROL
MUTING SW
TO SPKR SOCKET ON TV MODEL 21T244
ALL MEASURMENTS TAKEN WITH M13 IN FM POSITION UNLESS OTHERWISE SPECIFIED
• MEASURED WITH M13 IN AM POSITION
▲ MEASURED WITH VTVM
IF = 455 KC AM
IF = 10.7 MC FM
AM-FM-PHONO SELECTOR SW SHOWN IN PHONO POSITION
SW SEQUENCE
1 - PHONO 33 1/3, 45, 78 RPM
2 - AM RADIO
3 - FM RADIO

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V24	6CB6	2.7Meg ▲4.8Meg	39Ω	0Ω	.1Ω	▽3.8KΩ ▽42KΩ	▽150KΩ	0Ω	
V25	6J6	▽120KΩ	▽120KΩ	0Ω	.1Ω	4.8Meg	18KΩ	0Ω	
V26	6BA6	500KΩ ▲2.6Meg	0Ω	.1Ω	0Ω	▽2.9KΩ	▽25KΩ	68Ω	
V27	6AU6	.4Ω	0Ω	0Ω	.1Ω	▽2.9KΩ	▽25KΩ	120Ω	
V28	6AL5	3.3KΩ	40KΩ	.1Ω	0Ω	INF	0Ω	INF	
V29	6AV6	10 Meg	0Ω	0Ω	.1Ω	200KΩ ▲420KΩ	500KΩ ▲2.6Meg	▽270KΩ	
V30	6C4	▽85KΩ	INF	0Ω	.1Ω	▽85KΩ	68KΩ	3.6KΩ	
V31	6V6GT	0Ω	.1Ω	▽260Ω	▽2.3KΩ	540KΩ	270Ω	0Ω	0Ω
V32	6V6GT	0Ω	.1Ω	▽250Ω	▽2.3KΩ	470KΩ	270Ω	0Ω	0Ω
V33	5Y3GT	INF	1 Meg	INF	510Ω	INF	530Ω	INF	1 Meg

▲ TAKEN IN VACUUM TUBE VOLTMETER
ALL MEASUREMENTS TAKEN "FM" POSITION UNLESS OTHERWISE SPECIFIED
• MEASURED IN "AM" POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1953

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B),
21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)

AM-FM RADIO SCHEMATIC

RADIO ALIGNMENT INSTRUCTIONS

PROPERTY OF
L. F. DYER SHIP.
[illegible] ST.
[illegible], COLORADO

RADIO ALIGNMENT AM-FM CHASSIS RC 1111A

When aligning pointer turn tuning gang fully closed and set pointer to the limit of its travel at low frequency end of dial.

AM IF ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn tone control s for maximum highs and maximum lows.
When adjusting IF cores start with cores all the way out and adjust to first peak.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
26.	.01MFD	High side to pin 1 (grid) of 6BA6 (V26). Low side to chassis.	455KC (400∿Mod)	AM	Quiet point at low frequency end of dial.	Across voice coil.	A36,A37	Adjust for maximum output.
27.	"	High side to stator plates of AM RF section of tuning gang. Low side to chassis.	"	"	"	"	A38,A39	"

FM ALIGNMENT

Top shield must be in place and bottom shield removed.
Connect output meter across voice coil.
When adjusting IF cores start with cores all the way out and adjust to first peak.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
28.	.01MFD	High side to pin 1 (grid) of 6AU6 (V27). Low side to chassis.	Use marker 10.7MC	FM	Point of non-interference	DC probe to point (F). Common to chassis.	A40	Adjust for maximum deflection.
29.	"	"	10.7MC (400∿AM)	"	"		A41	Adjust for MINIMUM audio output on output meter.
30.	If necessary repeat steps 28 and 29 for best results. Make final adjustment using signal level to maintain -4 volts on VTVM.							
31.	.01MFD	High side to pin 1 (grid) of 6BA6 (V26). Low side to chassis.	10.7MC	FM	88MC	DC probe to point (F). Common to chassis.	A42, A43	Adjust for maximum deflection on VTVM.
32.	"	High side to stator plates of FM RF section of tuning gang. Low side to chassis.	"	"	"	"	A44, A45	"
33.	Two 120Ω Carbon Resistors	Across FM antenna terminals with 120Ω in each lead.	90MC (22.5KC swp)	"	"	Not used	L36	Compress or expand coil turns for maximum audio output
34.	"	"	106MC (22.5KC swp)	"	Tune to 106MC signal	DC probe to point (F). Common to chassis.	A46, A47	Adjust for maximum deflection.
35.	"	"	90MC (22.5KC swp)	"	Tune to 90MC signal	"	L35, L33	Compress or expand coil turns for maximum deflection.
36.	Repeat steps 33, 34 and 35 if necessary, for optimum tracking.							

AM RF ALIGNMENT

All RF shields should be in place during alignment.
Loop should be in place furing alignment.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
37.		Loop	1620KC	AM	Tuning gang fully open	Across voice coil	A48	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
38.		"	1400KC	"	Tune to 1400KC signal	"	A49, A50	"
39.		"	600KC	"	Tune to 600KC signal	"	A51	Shunt the AM RF section of tuning gang with a 10KΩ resistor. Adjust A51 for maximum output while rocking tuning gang. Remove the 10KΩ resistor.
40.		"	"	"	"	"	A52	Adjust for maximum output.
41.	Repeat steps 37 thru 40 until no improvement is noted.							

AM CHASSIS RC 1117B

Turn tuning gang fully closed and set pointer 3-15/16 inch from the left hand edge of dial back plate.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
42.	.1MFD	High side to pin 1 (grid) of 12BA6 (V35). Low side to B-.	455KC	Radio	Quiet point near 1600KC	Across voice coil	A53, A54	Adjust for maximum output.
43.	"	High side to pin 7 (grid) of 12BE6 (V34). Low side to B-.	"	"	"	"	A55, A56	"
44.		Loop	1620KC	"	Tuning gang fully open	"	A57	Receiver antenna loop and record player must be in cabinet for remainder of alignment. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
45.		"	1400KC	"	1400KC	"	A58	Adjust for maximum output.
46.	Repeat steps 44 and 45 if necessary.							

PARTS LIST CH. RC 1111B

TUBES (SYLVANIA or Equivalent)

ITEM No	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V24	FM-AM-RF Amp.	6CB6	6CB6	7CM	
V25	Converter	6J6	6J6	7BF	
V26	FM-AM-IF Amp.	6BA6	6BA6	7BK	
V27	FM Driver	6AU6	6AU6	7BK	
V28	Ratio Detector	6AL5	6AL5	6BT	
V29	Det-AVC-AF Amp.	6AV6	6AV6	7BT	
V30	Phase Inverter	6C4	6C4	6BG	
V31	Audio Output	6V6GT	6V6GT	7S	
V32	Audio Output	6V6GT	6V6GT	7S	
V33	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C103A	30	450	77324	PRS450/30-		C103		3N539	TVA-2735	Red
B	30	350		30				TC22	TVA-1206	Green
C	40	25		PRS25/50						Blue
C104	2	50	73747	PRS150/4		BBR-2-50T		TC302	TVA-1301	
C105	220		75611	SI220	D6-221		GP2K-221	UC-5322	5GA-T22	
C106	4700		73473	BPD-0047	DD-502	TM5D5	811-0047	DC-525	5HK-D47	
C107	4700		73473	BPD-0047	DD-502	TM5D5	811-0047	DC-525	5HK-D47	
C108	4700		73473	BPD-0047	DD-502	TM5D5	811-0047	DC-525	5HK-D47	
C109	100		39396	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C110	470	500	39644	1469-0005		5R5T5		MCB245	M8-35	
C111	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C112	15		39044	SI15N750	TCN-15		N750K-150	NT-5415	5TCU-Q15	
C113	68		75612		TCN-68				5TCU-Q68	
C114	68		75612		TCN-68				5TCU-Q68	
C115	6.8		77352							
C116	150		75614	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C117	5		75613	SI5N750	TCN-5		N750K-050	NT-555	5TCU-V5	
C118	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C119	47		76348	SI47	D6-470	TM5Q5	GP1K-470	UC-5447	5GA-Q47	
C120	5		75613	SI5N750	TCN-5		N750K-050	NT-555	5TCUB-V5	
C121	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C122	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C123	.047	200	73558	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C124	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C125	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C126	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C127	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C128	.005	200	72490	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C129	330	500	39640	1469-00035						
C130	330	500	39640	1469-00035						
C131	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C132	150		75614	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C133	.0033	400	73795	P688-0033	D6-332	PTE6D33	GP2-333-332	PT6233	6TM-D33	
C134	.018	200	77469							
C135	.015	200	73797							
C136	.022	400	73562	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C137	.0047	400	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C138	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C139	150		75614	SI150	D6-151	TM5T15	GP2K-151	UC-5315	5GA-T15	
C140	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C141	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C142	.0018	600	77468							
C143	.0068	400	73789	P688-0068	D6-682	PTE6D68	GP2-333-682		6TM-D68	
C144	.022	400	73562	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C145	.001	1000	75643	P1088-001		PTE16D1		PT1621	MB-D1	
C146	.001	1000	75643	P1088-001		PTE16D1		PT1621	MB-D1	
C147	.005	200	72490	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R122A	1.5Meg		75537	Q18-139XX	AT-95	SBT-222-S	UDT-291	Volume-Tap② 200KΩ, 400KΩ
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R122A
C	Switch		Not Req.	76-1	SW-A	Not Req.	US-26	Attach to R122A
R123	2 Meg		75561	Q17-139		B-77		Base
R124A	2 Meg		75562	Q13-139	AG-66-Z	B-76	U-55	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R124A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R125	2.2Meg	½	503532	BTS-2.2Meg	
R126	1000Ω	½	503210	BTS-1000	
R127	39Ω	½	503039		
R128	150KΩ	½	503415	BTS-150K	
R129	8200Ω	½	503282	BTS-8200	
R130	680Ω	½	503168	BTS-680	
R131	2.2Meg	½	503522	BTS-2.2Meg	
R132	18KΩ	½	503318	BTS-18K	
R133	100Ω	½	503110		
R134	120KΩ	½	503412	BTS-120K	
R135	390Ω	½	503139		
R136	2.2Meg	½	503522	BTS-2.2Meg	
R137	120KΩ	½	503412	BTS-120K	
R138	220KΩ	½	503422	BTS-220K	
R139	150KΩ	½	513415	BTA-150K	
R140	68Ω	½	503068		
R141	22KΩ	½	503322	BTS-22K	
R142	680Ω	½	503168	BTS-680	
R143	56KΩ	½	503356	BTS-56K	
R144	120Ω	½	503112	BTS-120	
R145	22KΩ	½	503322	BTS-22K	
R146	680Ω	½	503168	BTS-680	
R147	100Ω	½	503110	BTS-100	
R148	15KΩ	½	503315	BTS-15K	
R149	1200Ω	½	502212	BTS-1200	
R150	3300Ω	½	502333	BTS-3300	
R151	39KΩ	½	503339	BTS-39K	
R152	470KΩ	½	503447	BTS-470K	
R153	22Meg	½	504622	BTS-22Meg	
R154	1.5Meg	½	503515	BTS-1.5Meg	
R155	27KΩ	½	503327	BTS-27K	
R156	27KΩ	½	503327	BTS-27K	
R157	18KΩ	½	503318	BTS-18K	
R158	10 Meg	½	503610	BTS-10Meg	
R159	270KΩ	½	503427	BTS-270K	
R160	1 Meg	½	503510	BTS-1 Meg	
R161	3300Ω	½	502333	BTS-3300	
R162	68KΩ	½	503368	BTS-68K	
R163	82KΩ	½	503382	BTS-82K	
R164	470KΩ	½	503447	BTS-470K	
R165	100Ω	½	503110	BTS-100	
R166	470KΩ	½	503447	BTS-470K	
R167	270Ω	2	522127		
R168	2200Ω	5	73637	B3/4A-2250	

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T8	117VAC ③.72A	640VCT .080A	5VAC ③2A	6.3VAC ③3.4A	75566		P-2952 ①	PR-90 ①	R-11B ①

① Drill new mounting holes.

PARTS LIST CH. 1111B (CONT.)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T9	10KΩ CT	3.7Ω	510Ω CT	.6Ω	77323	A-3830 ①	A-2036 ①	RO-110 ①	S-15X ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L33	FM Ant. Coil	0Ω		77313				Tapped
L34	Fil. Choke	0Ω		71942	4602			1.07Microheneries
L35	FM RF Coil	0Ω		77314				
L36	FM Osc. Coil	0Ω		77315				Tapped
L37	Loop Ant.	0Ω	1.1Ω	77332				
L38	AM RF Coil	70Ω	4.1Ω	77305				Sec. Tapped② 2.8Ω
L39	AM Osc. Coil	1Ω	6.5Ω	75569				Pick Up Windings 2Ω
L40	1st. FM IF	.2Ω	.2Ω	75559	1451	16-3487 †		
L41	1st. AM IF	4.5Ω	10.5Ω	75558				Tertiary Windings. 11Ω
L42	Fil. Choke	0Ω		71942	4602			1.07 Microheneries
L43	2nd. FM IF	1.2Ω	.4Ω	75560	1451	16-3487†		
L44	2nd. AM IF	7.5Ω	7.5Ω	76328	12-C6	16-6770		
L45	Ratio Det.	1.2Ω	.20CT	73743	1453	17-3488		Tertiary windings. .2Ω

† Use mounting plate.

PHONO CARTRIDGE

ITEM No.	RCA Victor PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M8	75475	* 9-D	Q Q-33			96-0	0-1 or S-1 & 0-3 or S-3	* Complete arm and cartridge assembly

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THEIR RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	RCA Victor PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M9	* 75496	W-44MGA or W-44MGS	M-74LP or M-75LP	* 45-33 1/3 RPM Needle
	♦ 75497	W-44A or W-44S	M-74 or M-75	♦ 78 RPM Needle

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: RCA Victor PART No.	NOTES
M10	Bayonet	7.5	.2	White	11765	Type #51
M11	Bayonet	7.5	.2	White	11765	Type #51

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M12	Tuning Capacitor	77308	26-502MMF, 23-285MMF, 18-180MMF (Includes FM gang)
M13	Switch	77307	AM-FM -Phono Selector
	Dial Scale	77394	Model 21-T-244
	Escutcheon	77392	Model 21-T-244
	Pointer	77395	Model 21-T-244
	Knob	77330	Function Selector, Model 21-T-244 (Maroon)
	Knob	77328	Tuning, Tone (2), Off/On Volume, Model 21-T-244 (Maroon)

PARTS LIST CH. 1117B

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	INSTALLATION NOTES
V34	Converter	12BE6	12BE6	7CH	
V35	IF Amplifier	12BA6	12BA6	7BK	
V36	Det-AVC-AF Amp.	6AQ6	6AQ6	7BT	
V37	Phase Inverter	6AQ6	6AQ6	7BT	
V38	Audio Output	35C5	35C5	7CV	
V39	Audio Output	35C5	35C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C148A	▣80	150	73013	AFH3-13		CO12		FP216	R1312	
B	▲30	150						TC42		
C	10	150								
C149	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C150	56		77116							
C151	.0018	600	73851							
C152	.047	400	73553							
C153	.0018	600	73851							
C154	.0018	600	73851							
C155	.0047	400	73920							
C156	.022	200	73562	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C157	.0033	400	73795	P688-0033	D6-332	PTE6D33	GP2-333-332	PT6233	6TM-D33	
C158	.0039	400	73796							
C159	120		76347	SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C160	.022	400	73562	P488-022	DF-203			PT4122	4TM-S22	
C161	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C162	.0039	400	73796							
C163	.0039	400	73796							
C164	.047	400	75071	489ZX-05		PJ4S47		PT4147	4TM-S47	
C165	.047	400	73553	P488-047		PJ4S47		PT4147	4TM-S47	

PARTS LIST CH. 1117B (CONT.)

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R169A	2 Meg	½	76874	Q13-139X	AT-126	ABT-79	UT-454	Volume Tap② 400KΩ
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R169A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R170	39KΩ	½	503339	BTS-39K	
R171	3.3Meg	½	503533	BTS-3.3Meg	
R172	270Ω	½	503127	BTS-270	
R173	120KΩ	½	503412	BTS-120K	
R174	390KΩ	½	503439	BTS-390K	
R175	68KΩ	½	503368	BTS-68K	
R176	10Meg	½	503610	BTS-10Meg	
R177	220KΩ	½	503422	BTS-220K	
R178	10Meg	½	503610	BTS-10Meg	
R179	220KΩ	½	503422	BTS-220K	
R180	12KΩ	½	503312	BTS-12K	

* Special resistor 95Ω② 38°C & 13.5Ω② 104°C.

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R181	470KΩ	½	503447	BTS-470K	
R182	82Ω	½	503082	BTS-82	
R183	470KΩ	½	503447	BTS-470K	
R184	1800Ω	2	503218	BTS-1800	
R185	1200Ω	1	513212	BTA-1200	
R186	66Ω	5	77379		
R187	*	*	73072		
R188	1.5Meg	½	503515	BTS-1.5Meg	
R189	27KΩ	½	503327	BTS-27K	
R190	220KΩ	½	503422	BTS-220K	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T10	4.6KΩ CT	3.7Ω	282Ω CT	.56Ω	77122	A-3856	A-2900	RO-301	S-15X	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L46	Loop Ant	1.4Ω		76876				
L47	Osc. Coil	.4Ω	6Ω	76866	71-OSC	14-1040		
L48	Input IF	11.5Ω	11.5Ω	74918	12-C1	16-3758		
L49	Output IF	14Ω	14Ω	73037	12-C6	16-6770		

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: RCA Victor PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M14	.070ADC	7681	NB5	5M4	1003	6S75	75

PHONO CARTRIDGE

ITEM No.	RCA Victor PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M15	75475	*9-D	Q Q-33			96-0	0-1 or S-1 & 0-3 or S-3	* Complete arm and cartridge assembly

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THEIR RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

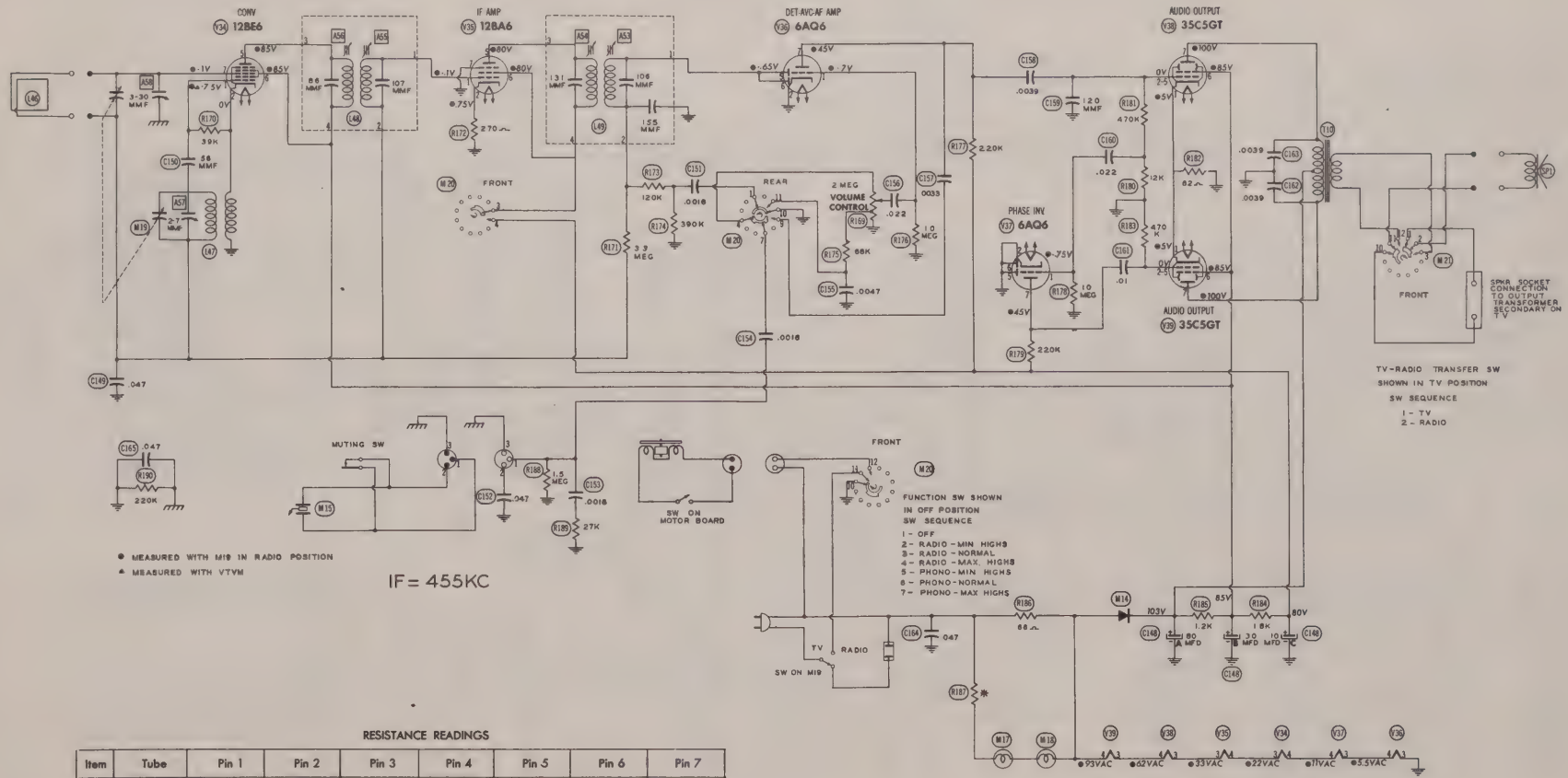
ITEM No.	RCA Victor PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M16	* 75496	W-44MGA or W-44MGS	M-74LP or M-75LP	* 45-33 1/3 RPM Needle
	♦ 75497	W-44A or W-44S	M-74 or M-75	♦ 78RPM Needle

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: RCA Victor PART No.	NOTES
M17	Bayonet	7.5	.2	White	11765	Type #51
M18	Bayonet	7.5	.2	White	11765	Type #51

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M19	Tuning Capacitor	76867	9-440MMF, 17-180MMF
M20	Switch	76873	Radio-Phono Selector and Tone
M21	Switch	77377	Transfer
	Dial Scale	77380	Model 21-T-242
	Escutcheon	74205	Model 21-T-242
	Pointer	77378	Model 21-T-242
	Knob	77386	Tuning, Model 21-T-242 (Beige)
	Knob	77365	Tuning, Model 21-T-242 (Maroon)
	Knob	77362	Tuning, Transfer Switch, Model 21-T-242 (Beige)
	Knob	75945	Tuning, Transfer Switch, Model 21-T-242 (Maroon)
	Knob	77388	Transfer Switch (outer), Model 21-T-242 (Beige)
	Knob	77387	Transfer Switch (outer), Model 21-T-242 (Maroon)
	Knob	77384	Radio-Phono Selector, Model 21-T-242 (Beige)
	Knob	77383	Radio-Phono Selector, Model 21-T-242 (Maroon)
	Knob	75464	Radio-Phono, Volume, Model 21-T-242 (Beige)
	Knob	74963	Radio-Phono, Volume, Model 21-T-242 (Maroon)



RESISTANCE READINGS

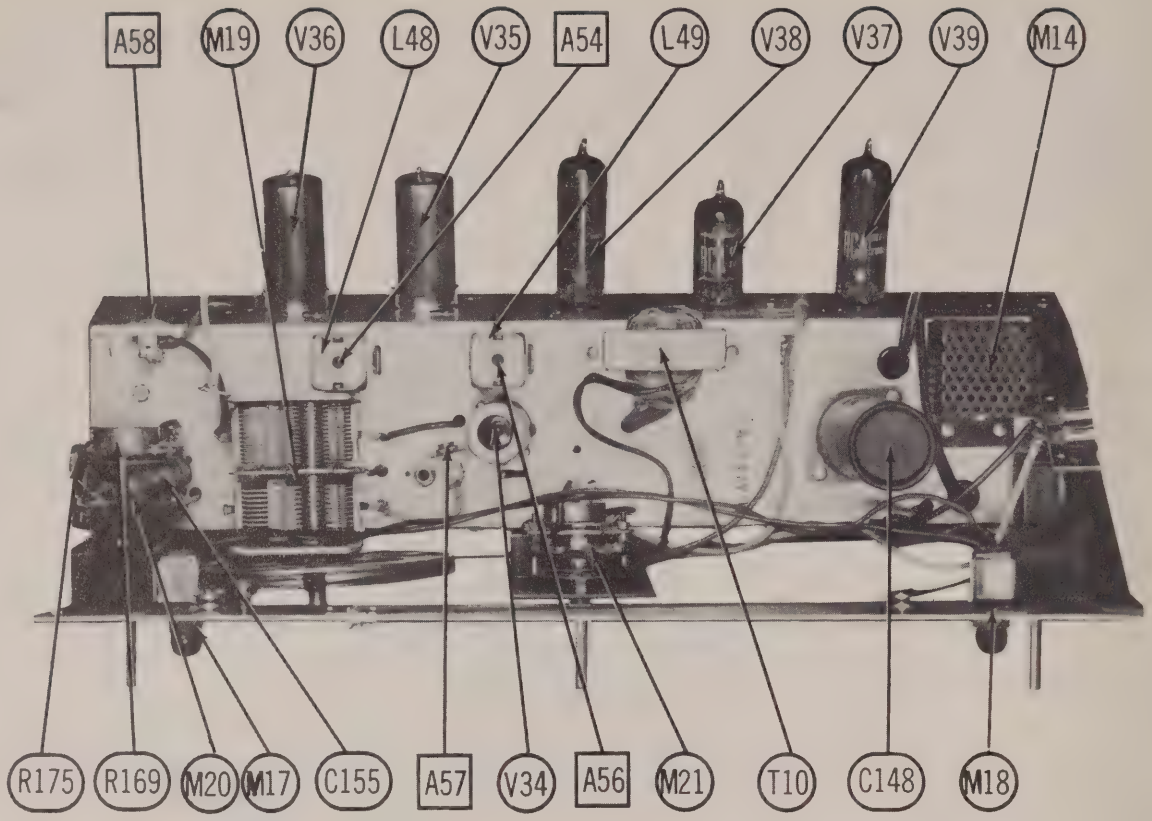
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V34	12BE6	39KΩ	.4Ω	26Ω	14Ω	†1.2KΩ	†1.2KΩ	3.9Meg
V35	12BA6	3.9Meg	0Ω	38Ω	26Ω	†3KΩ	†3KΩ	270Ω
V36	6AQ6	10Meg	0Ω	0Ω	7Ω	510KΩ	510KΩ	†220KΩ
V37	6AQ6	10 Meg	0Ω	7Ω	14Ω	0Ω	0Ω	†220KΩ
V38	35C5	82Ω	480KΩ	38Ω	74Ω	480K Ω	†1.2KΩ	†141Ω
V39	35C5	82Ω	470KΩ	74Ω	110Ω	470KΩ	†1.2KΩ	†141Ω

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM OUTPUT OF M14.

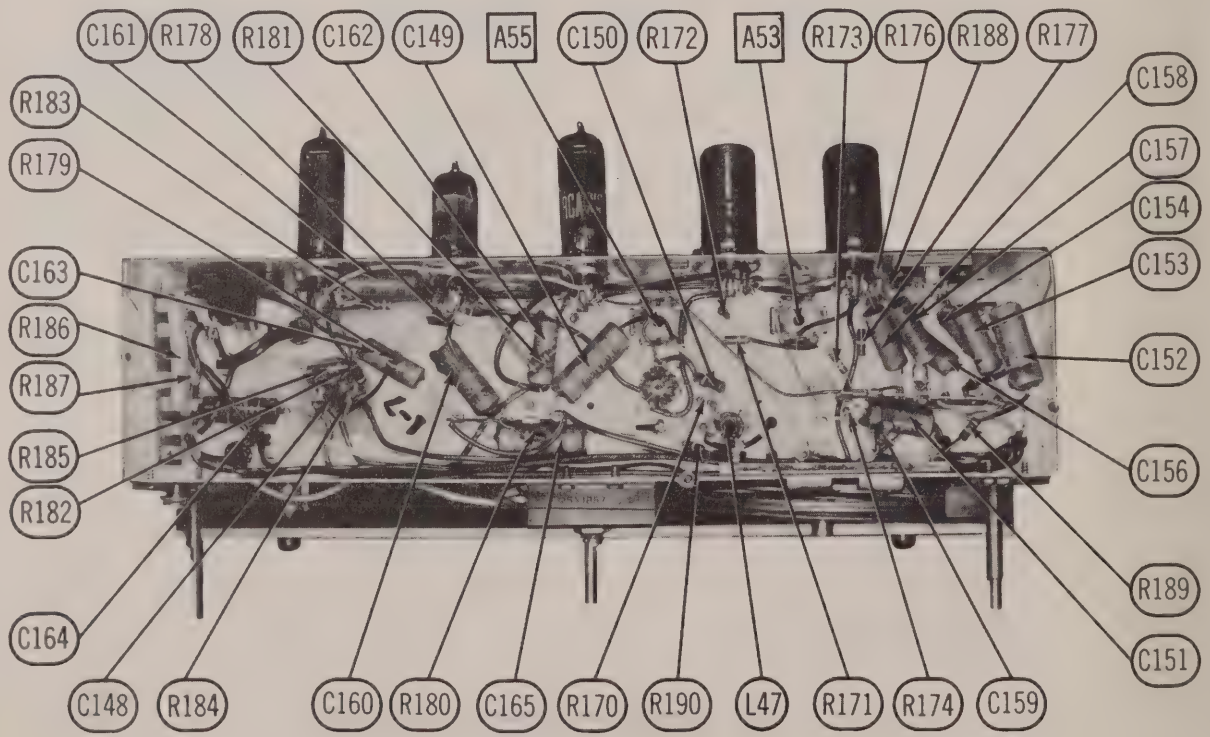
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953

RCA VICTOR MODELS 21-T-242 (Ch. KCS72D-1 & Radio Ch. RC1117B), 21-T-244 (Ch. KCS72D-2, Radio Ch. RC1111B, & Audio Ch. RC141C)

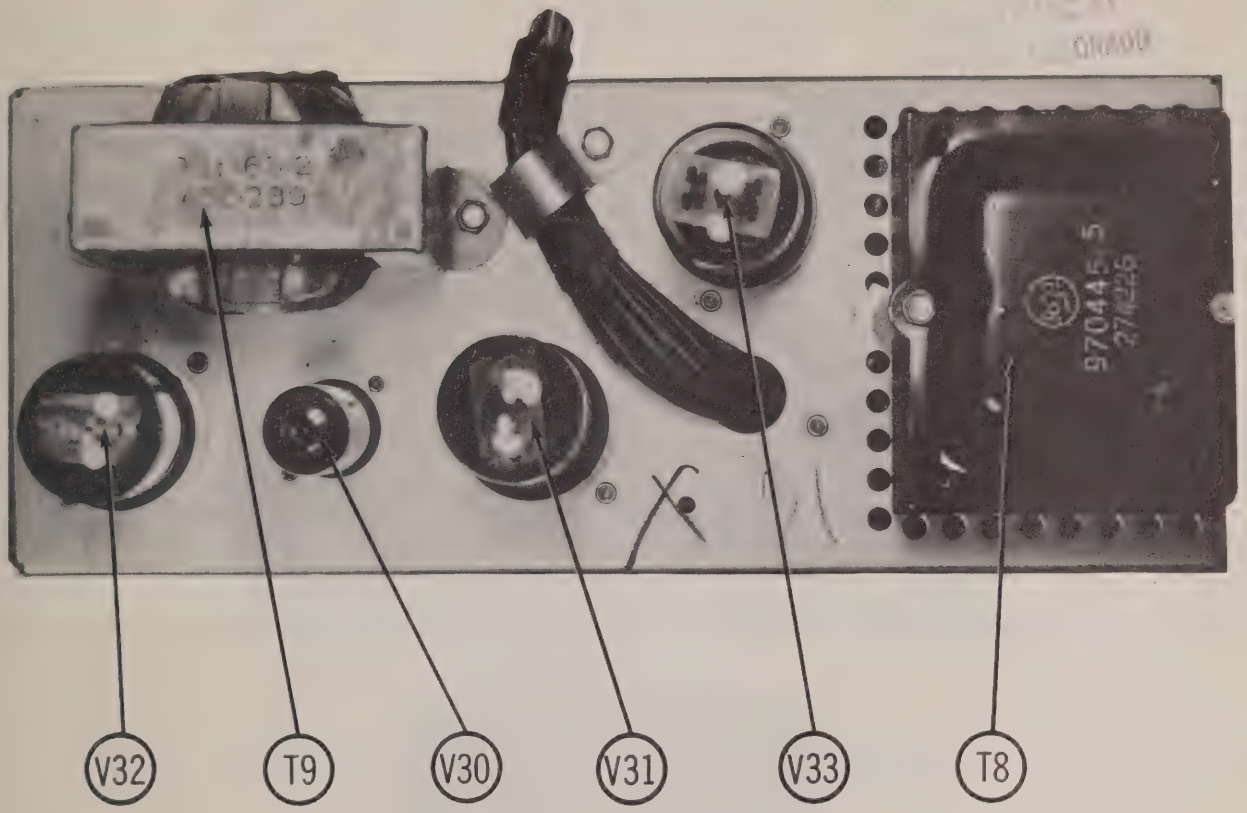
AM RADIO SCHEMATIC



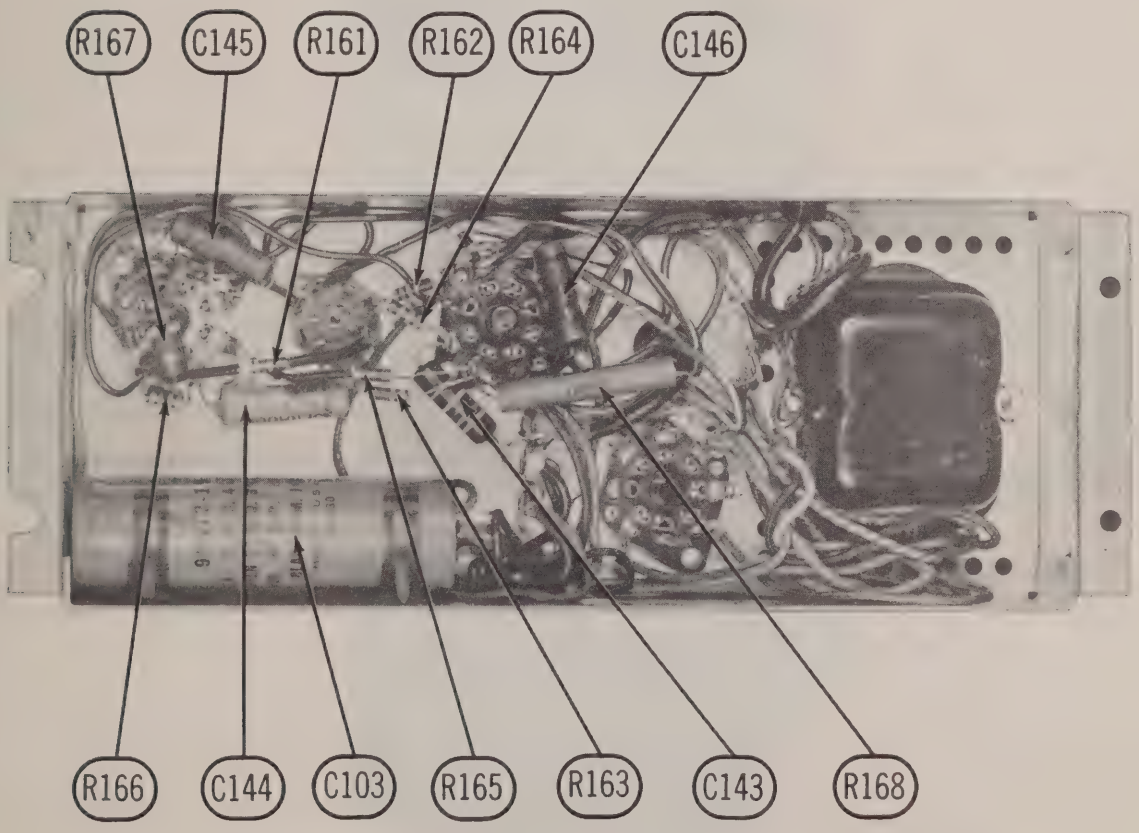
AM RADIO CHASSIS-TOP VIEW



AM RADIO CHASSIS BOTTOM VIEW



POWER CHASSIS - TOP VIEW



POWER CHASSIS BOTTOM VIEW

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP (Fig.1)

Check yoke. Check solder connections in yoke, yoke plug and socket.

INSUFFICIENT SWEEP

Check by substitution V17, V18, V19, V21 and V22.

Check amplitude of waveform W13:

If Insufficient	If Sufficient
Check components of V17. Check C89 and R112.	Check components V18 and V19, especially R113, R114, R115, C90 and C91.

DRIVE LINES

Check by substitution V17 and V18. Check C89 and VB4 (Horizontal drive control).

COMPRESSED AT LEFT SIDE

Substitute V18 and V19.

Check waveform W13:

If Unsatisfactory	If Satisfactory
Check compling network between V17 and V18.	Check T2 and T5. Check associated components.

FOLDS

Substitute V19. Check C92, C93 and C95. Check associated components.

VERTICAL

LOSS OF SWEEP

Check V15 and V16.

Check waveform W8:

If Unsatisfactory	If Satisfactory
Check components of vertical oscillator and coupling capacitor C69.	Check R6, R93, R94, R95, T3 and associated components.

INSUFFICIENT SWEEP

Substitute V15 and V16. Check associated components, especially C70 for leakage and C76 for open.

COMPRESSED AT BOTTOM

Substitute V15 and V16. Check C3A for open and C71 for leakage.

COMPRESSED AT TOP

Substitute V14 and V15. Check coupling network between V15 and V16.

COMPRESSED AT TOP, STRETCHED AT BOTTOM

Check C72 for leakage. Check V16 and yoke components.

FOLDS

Substitute V16. Check T4 and components.

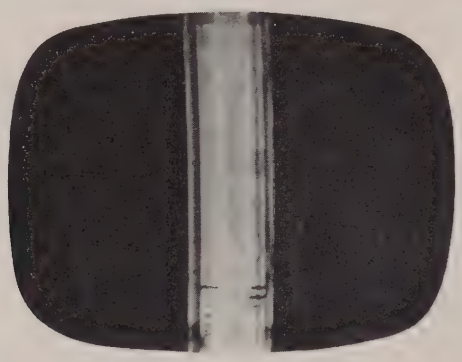


Fig. 1

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V6, V14 and V17 ,

Check waveform W11:

If Unsatisfactory,	If Satisfactory
Check components of V6B and V14B. Check coupling from V14B to V17.	Check V17 components particularly C85 for leakage and C102 for open.

CRITICAL SYNC

Check C101 for open.

PULLING PICTURE

Check C80 and C81 for open. Fig. 2 results from C102 being open.

VERTICAL

LOSS OF SYNC

Substitute V6, V14 and V15.

Check waveform W 7:

If Unsatisfactory	If Satisfactory
Check components of V6 and V14. Check C67 and C68 for leakage.	Check components of V15 plate and cathode circuits.

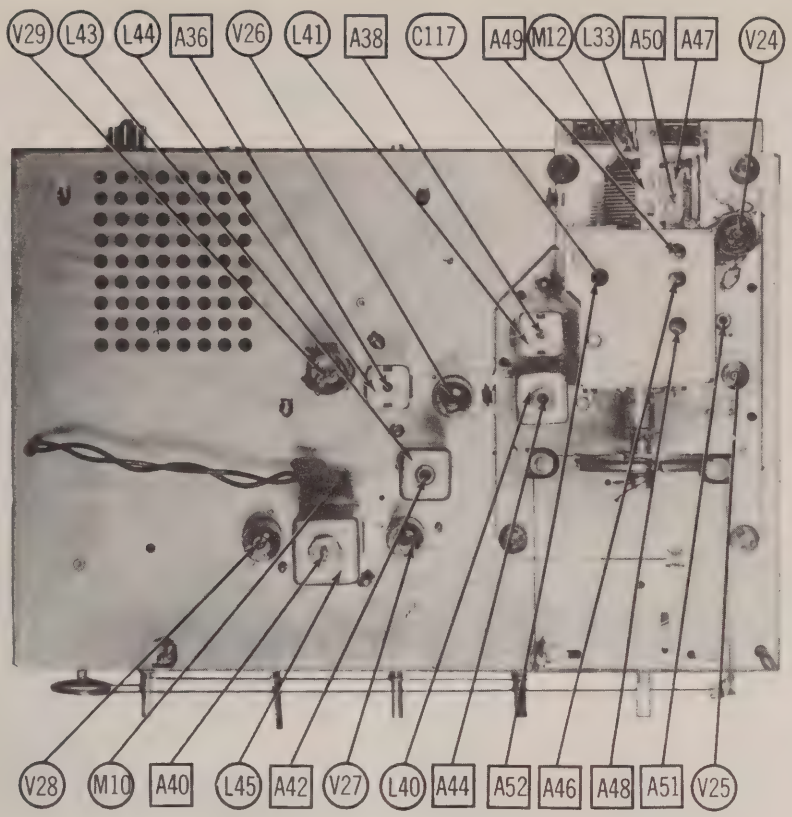
CRITICAL SYNC

Substitute V6 , V14 and V15. Check associated components for change in values.

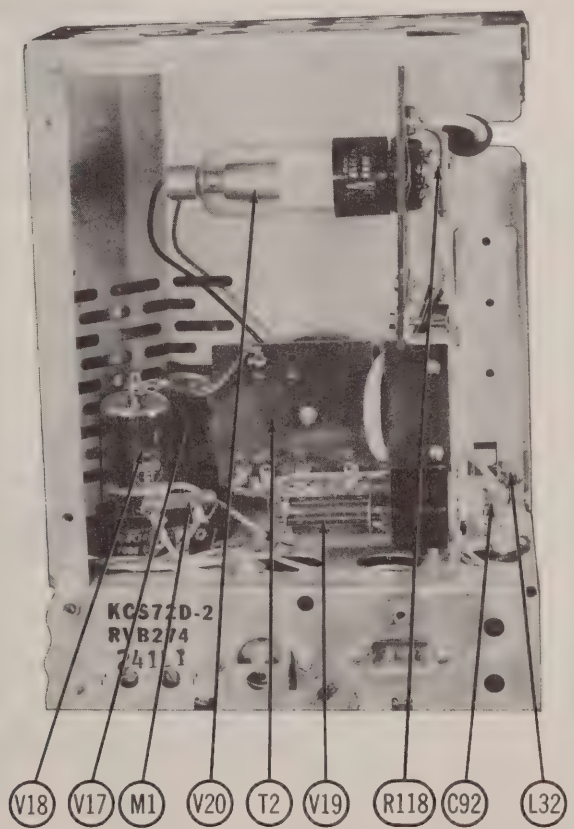
TRIGGERING

Substitute V15. Check filament lead dressing around grid circuit.

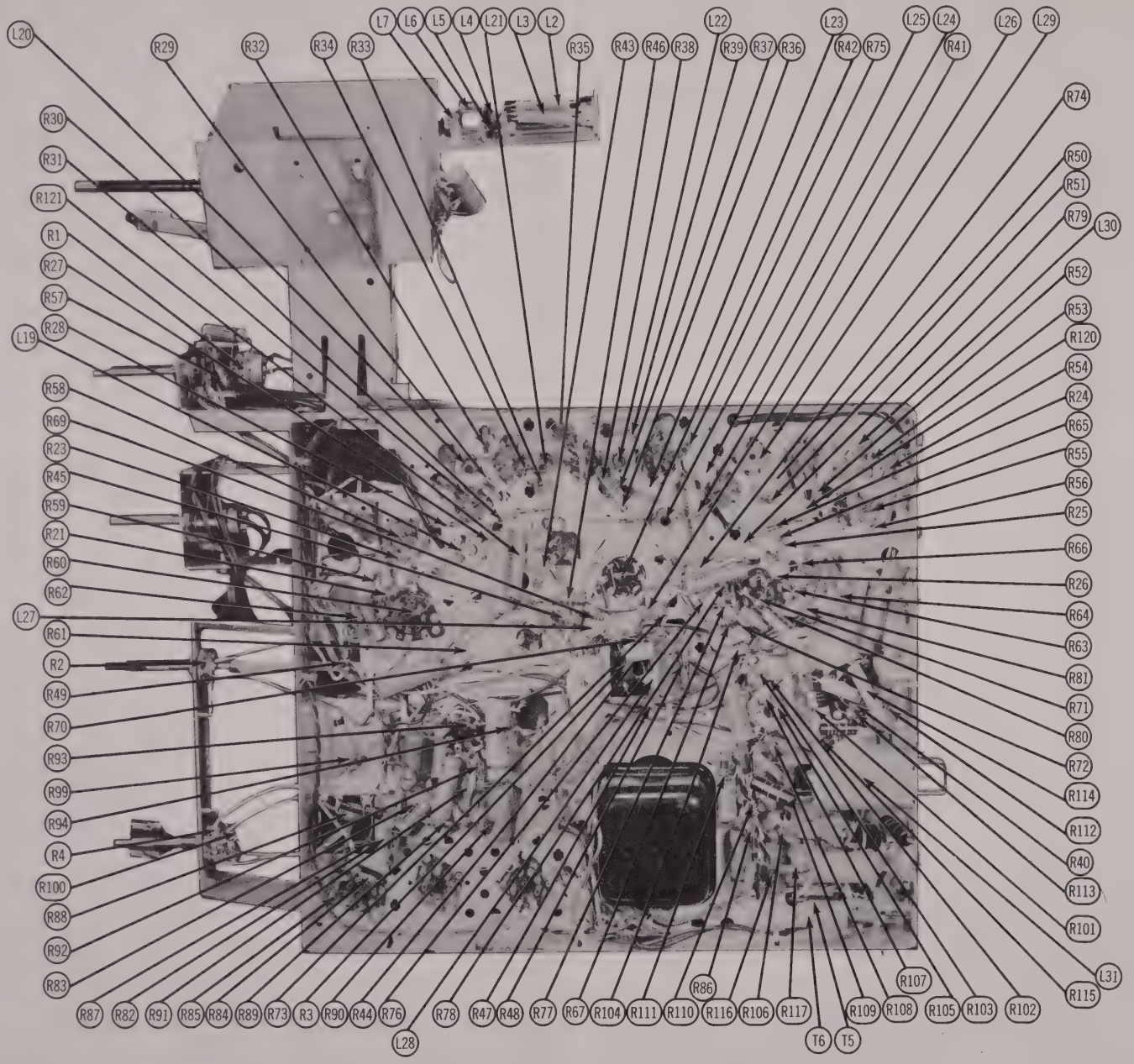
Fig.2



AM-FM CHASSIS-TOP VIEW



HIGH VOLTAGE COMPARTMENT



TV CHASSIS-BOTTOM VIEW-RESISTOR & INDUCTOR IDENTIFICATION

TV PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6CB6	6CB6	7CM	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector — Vert. Sync. Seperator	12AU7	12AU7	9A	
V7	Video Output	6AG7	6AG7	8Y	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier— AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Horiz. Sync. — Seperator Sync. Amplifier	6SN7GT	6SN7GT	8BD	
V15	Vert. Oscillator	6J5	6J5	6Q	
V16	Vert. Output	6K6GT	6K6GT	7S	
V17	Horiz. AFC — Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V18	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V19	Damper	6W4GT	6W4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5Y3GT	5Y3GT	5T	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA			RTMA BASE TYPE	NOTES
	RCA Victor PART No.	SYLVANIA PART No.	THOMAS PART No.		
V23	21AP4	21AP4		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▬80	400	76987	AFH2-45		BO47		FP245	TVL-2672	
B	▲10	350								
C2A	▬100	400	76970	AFH4-07		C152		FP431.4	TVL-4680	
B	■10	350								
C	▲20	50								
C3A	150	50	75218	AFH3-112		CO74		FP387.1	TVL-3638	
B	■10	350								
C	▲5	350								
C4	5	50	74521	PRS150/4		BR550		TV30	TVA-1303	
C5	100		75473	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C6	39		75450	SI39NP0	TCZ-39		NP0K-390			
C7	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C8	5000		73473	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C9A	1500		75089	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C10	1500		75166							
C11	12		75200				NP0K-120			
C12	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C13	1500		75166							
C14	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C15	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C16	390		75641	SI390	D6-391		GP2K-391	UC-5339	5GA-T39	
C17	3		76968							
C18	15		45465	SI15NP0	TCZ-15		NP0K-150	ZT-5415	5TCC-Q15	
C19	.7		71504		TCZ-.68		NP0K-R68			
C20	.7		71088		TCZ-.68		NP0K-R68			
C21	39		75196							
C22	6.8		75197	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C23	1500		75166							
C24	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C25	1500		75166							
C26	.1	200	73784	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C27A	4700		76990	BPD-2X0047	DD-2-502	TM5DD5	811-005	DCD-525	5HK-2D47	
B	4700						811-005			
C28A	4700		76990	BPD-2X0047	DD-2-502	TM5DD5	811-005	DCD-525	5HK-2D47	
B	4700						811-005			
C29	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C30	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C31	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C32	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C33	.33	200	76994							
C34	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C35	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C36A	4700		76990	BPD-2X0047	DD-2-502	TM5DD5	811-005	DCD-525	5HK-2D47	
B	4700						811-005			
C37A	4700		76990	BPD-2X0047	DD-2-502	TM5DD5	811-005	DCD-525	5HK-2D47	
B	4700						811-005			
C38	4700		73473	BPD-0047	DD-502	TM5D5	811-005	DC-525	5HK-D47	
C39	10000		73960	BPD-01	DD-103	TM5S1	821-01	DC-511	5HK-S1	
C40	10		33098	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C41	47	500		1469-00005		5R5Q5		MCB225	MS-45	
C42	.015	200	73797	P288-015		PTE6S15		TP400	6TM-S15	
C43	270	500		1469-0003		5R5T3		MCB241	MS-33	
C44	39		73664	SI39	D6-390	5W5Q4	GP1K-390	UC-5439	5GA-Q39	
C45	.1	200	73784	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C46	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C47	220		76673							
C48	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C49	.0015	600	76508	P688-0015	D6-152	PTE6D15	GP2L-152	PT6215	6TM-D15	
C50	.0033	600	73795							

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C51A	10000		76981	BPD-01	DD-3-103	TM5D81	821-01	DC-511	5HK-281	
B	10000			BPD-01			821-01	DC-511		
C52	10000		73960	BPD-01	DD-103	TM5B1	821-01	DC-511	5HK-S1	
C53	470	500	39644	1469-0005		5R5T5		MCB245	MS-35	
C54	470	500	39644	1469-0005		5R5T5		MCB245	MS-35	
C55	.0022	600	73595	P688-0022	D6-222	PTK6D22	GP2-333-222	PT6222	6TM-D22	
C56	.0047	600	73920	P688-0047	D6-472	PTK6D47	GP2-333-472	PT6247	6TM-D47	
C57	.012	200	74938							
C58	.01	400	73561	P488-01	D6-103	PTK6S1	GP2-333-103	PT611	4TM-S1	
C59	.0027	600	73599							
C60	200		47617							
C61	.01	400	73561	P488-01	D6-103	PTK6S1	GP2-333-103	PT611	4TM-S1	
C62	.0027	1600	73818							
C63	330	500	39640	1469-00035						
C64	.1	400	73551	P488-1	DF-104	PTK4P1		PT401	4TM-P1	
C65	.047	400	73553	P488-047	DF-503	PTK4S47		PT4147	4TM-S47	
C66	.0082	400	73808							
C67	.001	600	75643	P688-001	D6-102	PTK6D1	GP2L-102	PT621	6TM-D1	
C68	390	1000	73094							
C69	.1	600	73557	P688-1	DF-104	PTK6P1		PT601	6TM-P1	
C70	.1	400	73551	P488-1	DF-104	PTK4P1		PT401	4TM-P1	
C71	.033	600	73596							
C72	.0022	600	73595	P688-0022	D6-222	PTK6D22	GP2-333-222	PT6222	6TM-D22	
C73	.068	200	73792							
C74	.022	600	73798	P688-022		PTK6S22		PT6122	6TM-S22	
C75	.0015	1000	77123	P1088-0015					MB-D15	
C76	.0047	600	83828							
C77	.0033	600	73795							
C78	270	1000	76579							
C79	220	1000	75248							
C80	82	1000	76474							
C81	.047	600	73553	P688-047	DF-503	PTK6S47		PT6147	6TM-S47	
C82	.001	600	75643	P688-001	D6-102	PTK6D1	GP2L-102	PT621	6TM-D1	
C83	68	1000	76475							
C84	12		33380							
C85	.1	400	73551	P488-1	DF-104	PTK4P1		PT401	4TM-P1	
C86	330	1000	76476							
C87	.01	600	73594							
C88	.0012	600	78488							
C89	.00068	600	76479							
C90	.1	600	73557	P688-1	DF-104	PTK6P1		PT601	6TM-P1	
C91	.27	200	73786							
C92	270	1000	76579							
C93	.027	1000	73811							
C94	.022	1000	73810	P1088-022				PT16122	MB-S22	
C95	330	1000	76476							
C96	500	20000	76461	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C97	.1	600	73561	P688-1	DF-104	PTK6P1		PT601	6TM-P1	
C98	91									
C99	.047	400	75071	4892X-05		PJ485		PT4147	4TM-S47	
C100	.047	400	75071	4892X-05		PJ485		PT4147	4TM-S47	
C101	.022	400	73563	P488-022		PTK4S22		PT4122	4TM-S22	
C102	.47	200	73787	P288-47		PJ285		PT405	2TM-P47	

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	77010	Q13-137X	AK-111	ABT-73	UT-438	Volume Tap② 280KΩ
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R1A
R2	200KΩ	½	76444	QJ-325*				Brightness
R3	75KΩ	½	76445	Q13-118XX				Contrast Tap② 4875Ω & 10KΩ
R4A	1.2Meg	½	76974	QJ-346**	RTV-357	SBB-716		Vert. Hold- Panel
B	75KΩ							Horiz. Hold-Rear
R5A	2.5Meg	½	76448	Q11-239	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	1000Ω	½	76976	Q11-108	AG-8-S	AB-5	U-4	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	500KΩ	½	76975	Q11-193	AG-58-S	AB-59	SU-50	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT-KIT K-3, BASE ELEMENTS & SHAFTS B11-129 & P1-200 (Panel) Rear (None) & R5-215.

** CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B11-138 & P1-200 (Panel) B11-126 & R1-216 (Rear).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
R8	3900Ω	½	503239	BTS-3900	
R9	3900Ω	½	503239	BTS-3900	
R10	150Ω	½	503115	BTS-150	
R11	27Ω	½	503027		
R12	62Ω	½	503068		
R13	22KΩ	½	503322	BTS-22K	
R14	2200Ω	½	503222	BTS-2200	
R15	100KΩ	½	503410	BTS-100K	
R16	4700Ω	½	502247	BTS-4700	
R17	100KΩ	½	503410	BTS-100K	
R18	100KΩ	½	503410	BTS-100K	
R19	10KΩ	½	503310	BTS-10K	
R20	10KΩ-5%	½	502310	BTS-10K-5%	
R21	3300Ω	2	533233	BTB-3300	
R22	470Ω	½	503147	BTS-470	
R23	100KΩ	½	503410	BTS-100K	
R24	1.8Meg-5%	½	11769	BTS-1.8Meg-5%	
R25	180KΩ-5%	½	503418	BTS-180K-5%	
R26	120KΩ-5%	½	30180	BTS-120K-5%	
R27	1000Ω	½	503210	BTS-1000	
R28	470-5%	½	502047		
R29	1000Ω	½	503210	BTS-1000	
R30	39KΩ	½	503339	BTS-39K	
R31	12KΩ-5%	½	502312		
R32	390-5%	½	502039		
R33	1000Ω	½	503210	BTS-1000	
R34	10KΩ-5%	½	502310		
R35	180Ω-5%	½	502118	BTS-180-5%	
R36	27KΩ	1	513327		
R37	1000Ω	½	503210	BTS-1000	
R38	33KΩ	1	513333	BTA-33K	
R39	18KΩ	½	503318		
R40	2.2Meg	½	503522	BTS-2.2Meg	
R41	3900Ω-5%	½	502239	BTS-3900-5%	
R42	33Ω	½	503033		

RESISTORS (CONT.)

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	IRC PART No.	NOTES
R43	39KΩ	1	513339	BTA-39K	
R44	2200Ω	2	523222	BTB-2200	
R45	18KΩ	2	523318	BTB-18K	
R46	15KΩ	2	523315	BTB-15K	
R47	5600Ω	½	503256	BTS-5600	
R48	150KΩ	½	503415	BTS-150K	
R49	150KΩ	½	503415	BTS-150K	
R50	82Ω	½	503082	BTS-82	
R51	1000Ω	½	503210	BTS-1000	
R52	2200Ω	½	503222	BTS-2200	
R53	47Ω	½	503047		
R54	39KΩ	½	503339	BTS-39K	
R55	10KΩ-5%	½	502310	BTS-10K-5%	
R56	10KΩ-5%	½	502310	BTS-10K-5%	
R57	27KΩ	½	503327	BTS-27K	
R58	10 Meg	½	503610	BTS-10 Meg	
R59	330KΩ	½	503433	BTS-330K	
R60	470KΩ	½	503447	BTS-470K	
R61	820Ω	2	76988	BTB-820	
R62	2200 Ω	½	503222	BTS-2200	
R63	56KΩ	½	503356	BTS-56K	
R64	470KΩ	½	503447	BTS-470K	
R65	12KΩ	½	503312	BTS-12K	
R66	47KΩ	½	503347	BTS-47K	
R67	560KΩ	½	603456	BTS-560K	
R68	470KΩ	½	503447	BTS-470K	
R69	68KΩ	½	503368	BTS-68K	
R70	10KΩ	½	503310	BTS-10K	
R71	680KΩ	½	503468	BTS-680K	
R72	15KΩ	½	503315	BTS-15K	
R73	18KΩ	½	503318	BTS-18K	
R74	270KΩ	½	503427	BTS-270K	
R75	2.2Meg	½	503522	BTS-2.2Meg	
R76	680KΩ	½	503468	BTS-680K	
R77	1 Meg	½	503510	BTS-1 Meg	
R78	47KΩ	½	503347	BTS-47K	
R79	22KΩ	½	503322	BTS-22K	
R80	8200Ω	1	513282	BTA-8200	
R81	3900Ω-5%	½	502239	BTS-3900-5%	
R82	22KΩ	½	503322	BTS-22K	
R83	18KΩ	½	503318	BTS-18K	
R84	390KΩ	½	503439	BTS-390K	
R85	1.2Meg-5%	½	502512	BTS-1.2Meg-5%	
R86	560KΩ	½	503456	BTS 560K	
R87	150KΩ	½	503415	BTS-150K	
R88	100KΩ	1	513410	BTA-100K	
R89	56KΩ-5%	1	512356	BTA-56K-5%	
R90	8200Ω	½	503282	BTS-8200	
R91	270KΩ-5%	½	502427	BTS-270K-5%	
R92	8200Ω	½	503282	BTS-8200	
R93	1.2Meg-5%	½	502512	BTS-1.2Meg-5%	
R94	1.1Meg-5%	½	502511	BTS-1.1Meg-5%	
R95	470Ω	1	513147	BTA-470	
R96	560Ω	½		BTS-560	
R97	560Ω	½		BTS-560	
R98	1000Ω	½	503210	BTS-1000	
R99	22KΩ	1	513322	BTA-22K	
R100	68KΩ	1	513368	BTA-68K	
R101	150KΩ	½	503415	BTS-150K	
R102	330KΩ	½	503433	BTS-330K	
R103	820KΩ	½	503482	BTS- 820K	
R104	330KΩ-5%	1	512433	BTA-330K-5%	
R105	82KΩ	1	513382	BTA-82K	
R106	3900Ω	½	503239	BTS-3900	
R107	150KΩ-5%	1	512415	BTA-150K-5%	
R108	1.8Meg-5%	1	512518	BTA-1.8Meg-5%	
R109	18KΩ	½	503318	BTS-18K	
R110	820KΩ	½	503482	BTS-820K	
R111	47KΩ-5%	1	512347	BTA-47K-5%	
R112	470KΩ	½	503447	BTS-470K	
R113	47Ω	½	503047		
R114	180Ω	2	76839	BW-2-180	
R115	68000Ω	2	533268	BTB-6800	
R116	56KΩ	½	503356	BTS-56K	
R117	560Ω	1	513156	BTA-560	
R118	5.1Ω	½	76796		
R120	2500Ω	10	76469	1 3/4A-2500	
R121	4650	7	76989	1 3/4A-5000	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC ⑩1.92A	680VCT .270ADC	5VAC ⑨ 6A	6.3VAC ⑨ 5A	76984	P-8166		TP-356	
			SEC. 4	SEC. 5					
			6.3VAC ⑨ 1.2A	6.3VAC ⑨ 7.1A					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	20Ω	0Ω	76795		HVO-9		D-19 ⑤	Horiz. Output Trans.
	tap ⑨ 8Ω, 33Ω, 37Ω, 51Ω,							
T3	485Ω tap ⑨ 15Ω		76978	A-8113①②	A-3035 ①②	TSO-7 ①	A-101U	Vert. Output Trans.
T4A	24Ω		76616	DY-9A	MDF-70	TY-3	Y-17	Horiz. Deflection Coils
B	45Ω							Vert. Deflection Coils
T5	21Ω		76442	WC-5 ④	MWC-1 ④	TWL-1	WC-12	Horiz. Lin. Coil
T6	12Ω		76441	WC-5 ④	MWC-1 ④	TWL-1	WC-11	Width Coil

① Connect as auto trans.
② Use original mounting bracket.
④ Enlarge mounting hole.
⑤ Connect terminal 7 to terminal 8 for auto transformer operation.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	6.5KΩ	3.7Ω	340Ω	.44Ω	76997	A-3878 ①	A-2930 ①	RO-301 ①	S-5X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	RCA Victor PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.7Ω	76093	12J11	12A31	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	270ADC	39Ω	1.24 Hy.	76498	C-2326 ①	C-2996 ①	TR-1733 ①	C-23X ①

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	RCA Victor PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L2	Ant. Trans.	.5Ω	.5Ω	73591				
L3	Ant. Trans.	.5Ω	.5Ω	73591				
L4	IF Trap	.2Ω		75242				Wound on 18MMF cap.
L5	Ant. Shunt Coil	.2Ω		75241				
L6	IF Trap	.2Ω		75242				Wound on 18MMF cap.
L7	FM Trap	0Ω		75449				
L8	Ant. Coils	0Ω		75180				Includes stator complete with rotor, coils C7, C8, R8, R9, & R10.
L9	Fil. Choke	0Ω		73477				
L10	RF Coils	0Ω		76964				Includes stator complete with rotor, coils C14, R14. Channel 13 includes .8-3.8MMF, Trimmer Cap.
L11	RF Coil	0Ω		75183				Includes stator complete with rotor coils, C15, C16, R15, R16, & R17. Channel 13 includes .8-3.8MMF Trimmer Cap.
L12	Mixer Grid Coils	0Ω		77459				Includes stator complete with rotor coils C18, C19. Wound on 75Ω Co-ax cable
L13	Mixer Grid Coils	0Ω		75182				.56Microheneries
L14	Osc. Coils	0Ω		76963				Includes Trap 18KΩ resistor
L15	Fil. Choke	0Ω		75201				
L16	RF Choke	.31Ω		75202			CLA	
L17	Trap Coil	0Ω		75185				
L18	Conv. Plate	.3Ω	0Ω	75181				
L19	1st. Video IF	.2Ω	.2Ω	76979				
L20	2nd. Video IF	.4Ω	.4Ω	76980				
L21	3rd. Video IF	.4Ω	.4Ω	76980				
L22	4th. Video IF	.4Ω	.4Ω	76980				
L23	Series Peak. Coil	3Ω		76011	6176	19-4036		36 Microheneries
L24	Shunt Peak. Coil	11.5Ω		75252	6174	19-4500		500 Microheneries
L25	4.5MC Trap	2.2Ω		76983	1470	20-1004		
L26	Series Peak. Coil	4.2Ω		71527	6177	19-4093		93 Microheneries
L27	Shunt Peak. Coil	25Ω		77124	4652*			1000Microheneries-Wound on 10KΩ resistor.
L28	Series Peak. Coil	7Ω		71526	6181	19-4251		250 Microheneries
L29	Sound IF	1.5Ω		76981				Includes 22MMF Cap 120KΩ resistor.
L30	Ratio Det.	8.5Ω	.6ΩCT	77112	1468	17-3493		Tertiary windings. 2Ω
L31	Horiz. Osc.	85Ω		76440	6183	20-1402		Tap⑨ 56Ω Horiz. wave form windings. 45Ω
L32	RF Choke	.72Ω		76640	4604		CL-1	1.5 Microheneries

* Parallel with 10KΩ resistor.

FUSES

ITEM No.	TYPE	RATING	RCA Victor PART No. FUSE	RCA Victor PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG P/T	1/4A 250V	73600		318.250 (3AG-1/4A P/T)		GJV 1/4	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	RCA Victor PART No.	NOTES
M2	Bayonet	7.5	.2	White	11765	Type #51

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M3	RF Tuner	KRK-2D	
M4	Switch	77339	Tone Control
M5	Switch		Transfer
M6	Focus Magnet	76168	Includes Centering Device
M7	Ion Trap	76141	
B3, B4	Trimmer Cap. Assy.	75217	Horiz. Locking Range, Horiz. Drive (2)
A7	Trimmer Cap.	71496	IF link
	Back	77381	Television Compartment, Model 21T242
	Back	77391	Television Compartment, Model 21T244
	Safety Glass	76622	
	Mask	77036	
	Escutcheon	75456	Channel Indicator
	Mask	76589	Channel Indicator (Beige)
	Mask	75459	Channel Indicator (Burgundy)
	Knob	76596	Brightness, Vert. Hold, TV Tone (Beige) (3 Used)
	Knob	76595	Brightness, Vert. Hold, TV Tone (Maroon) (3 Used)
	Knob	75464	Off/On Volume, Horiz. Hold, Picture (Beige) (3 used)
	Knob	74963	Off/On Volume, Horiz. Hold, Picture (Maroon) (3 used)
	Knob	76594	Channel Selector (Beige)
	Knob	76593	Channel Selector (Maroon)
	Knob	76592	Fine Tuning (Beige)
	Knob	76591	Fine Tuning (Maroon)

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine tuning knobs. Remove selector escutcheon. (Remove sliding spring to left.)

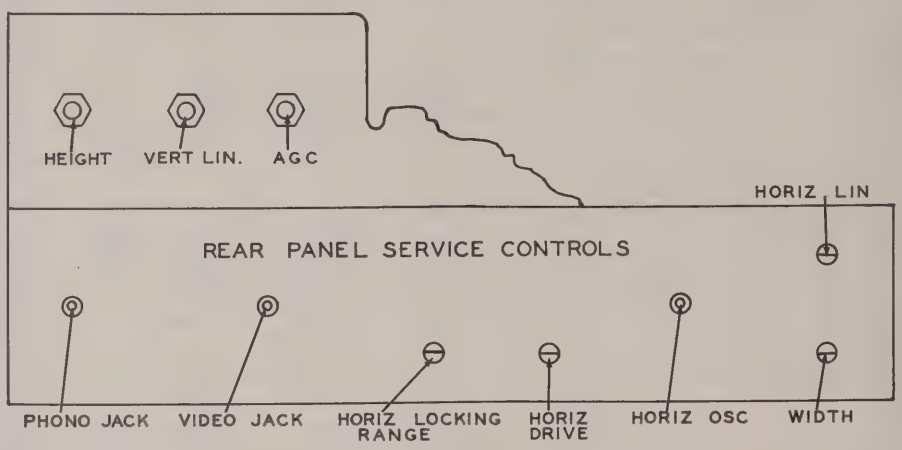
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis.(See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC THRESHOLD CONTROL ADJUSTMENT

Check the adjustment of the control by tuning to a strong signal, synchronizing the picture and switching off channel and back again.

If the picture reappears immediately the setting is satisfactory. If the picture requires an appreciable portion of a second to reappear, or bends excessively, the control should be adjusted.

Turn the control fully counter clockwise.

A slight bend of the picture may be present but it should be disregarded.

Turn the control clockwise until a slight bend or change of bend appears in the picture, then counter clockwise just enough to remove the bend or change of bend.

If unable to make the picture bend due to weak signal, turn the control clockwise until snow in the picture becomes more pronounced, then counter clockwise until the best signal to noise ratio is obtained.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Turn horizontal hold fully clockwise. Adjust horizontal frequency slug (B1), until picture is just out of sync with a black vertical or diagonal blanking bar in the raster. Then turn B1 until bar moves out of picture leaving it in sync.

SOUND IF DETECTOR BUZZ ADJUSTMENT

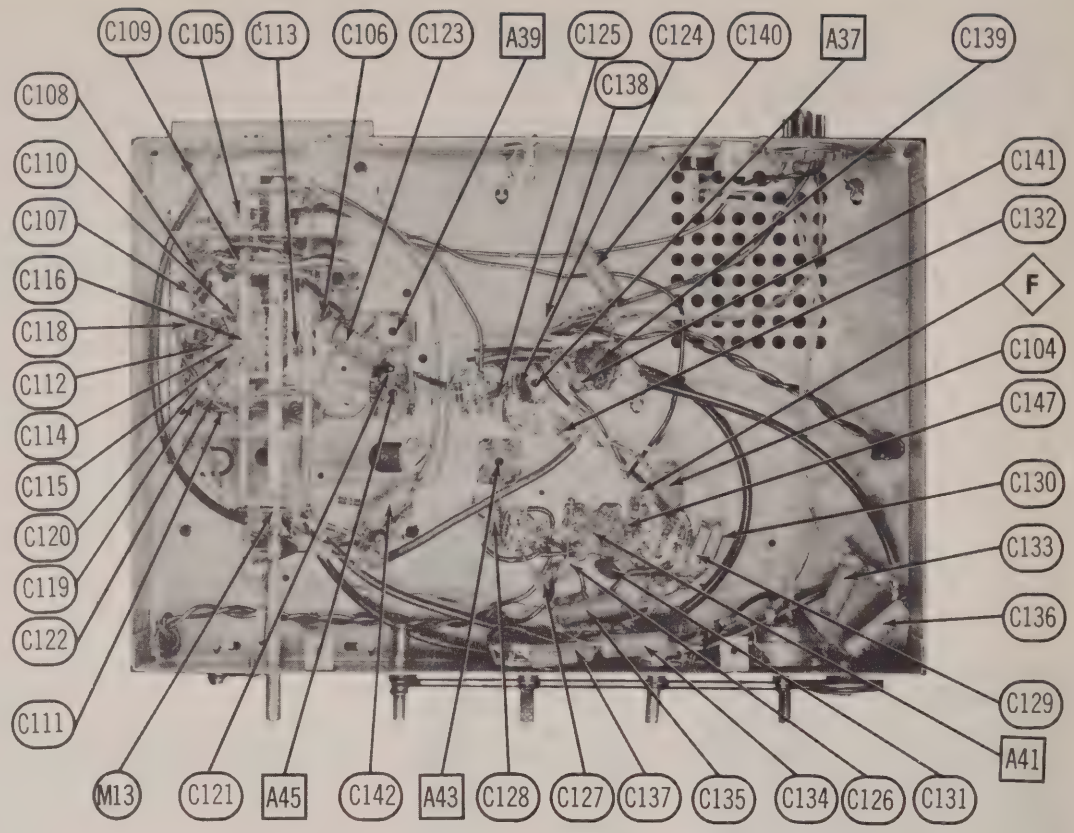
To eliminate Sound IF Detector buzz, adjust the Ratio Detector Secondary L30 located on bottom of chassis. Not accessible in cabinet. (See disassembly instructions).

FUSES

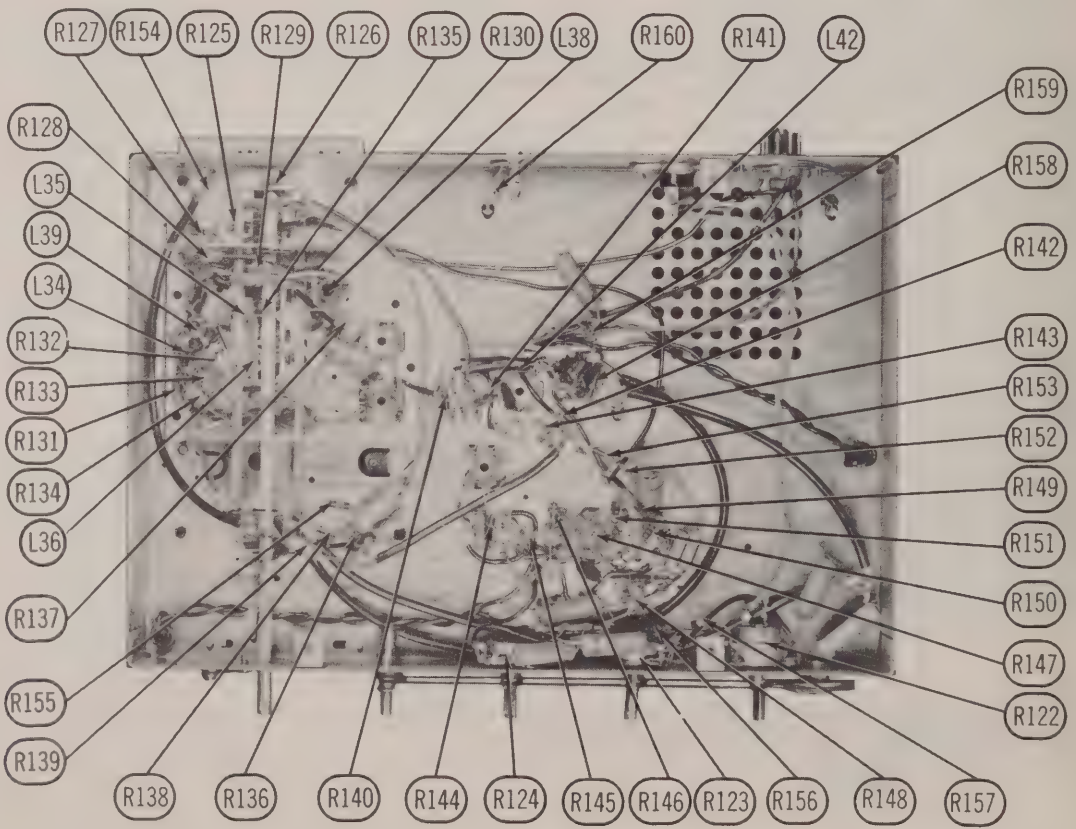
One fuse is used for LV Power Supply protection . (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.



AM-FM CHASSIS-BOTTOM VIEW



AM-FM CHASSIS-BOTTOM VIEW

TROUBLE SHOOTING AIDS (CONT.)

VIDEO

SOUND BARS

Check adjustment of All (4.5MC Trap) in video amplifier grid circuit. Check local oscillator adjustment video IF alignment.

POOR RESOLUTION

Check by substitution video IF tubes. Check alignment of video IF stages.

SMEAR

Check video amplifier V7 and associated components, particularly the peaking coils.

ONE WIDE BLACK BAR

Check tuner, video IF, video detector and video amplifier tubes for filament to cathode leakage.

POOR CONTRAST

Check waveform W1.

If Unsatisfactory	If Satisfactory
Check V3, V4, V5 and V6. Check alignment.	Check waveform W2;

Check waveform W2.

If Unsatisfactory	If Satisfactory
Substitute V7 and check associated components.	Check picutre tube and grid circuit components.

AUDIO

WEAK OR NO SOUND

Substitute V9, V10, V11, V12 and V13. Check associated components. Check speaker. Check sound IF and ratio detector alignment. Check function switch contacts.

BUZZ

Adjust ratio detector secondary for minimum buzz. If still noticable, substitute V11 and readjust.

DISTORTED

Check audio amplifier stages V12 and V13 using audio signal generator and scope.

If Undistorted	If Distorted
Substitute V9, V10, and V11. Check adjustment of ratio detector.	Check components of stage where distortion occurs.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check fuse in high voltage cage.
Check waveform W13.

If Unsatisfactory	If Satisfactory
Check horizontal oscillator components and coupling network between V17 and V18.	Check components of V18. Check T2 and T4. Check all associated components.

WEAK HIGH VOLTAGE

Follow procedure outlined under loss of high voltage.

BLOOMING

Substitute V18, V20, V21 and V22. Check associated components. Check picture tube.

LOSS OF FOCUS

Check C90 for open. Follow procedure outlined under blooming.

POWER

SMALL RASTER, WEAK SOUND

Check B plus circuits for shorts. If no shorts are present and B plus is low, check V21 and V22.

DIM PICTURE

Measure B plus.

If Low	If Normal
Substitute V21 and V22. Check for shorts.	Check V19 and boost B plus circuit.

GENERAL

RASTER, BUT NO PICTURE, SOUND OR SNOW

Check by substitution V2, V3, V5, V6 and V7. Check associated components.

WEAK PICTURE AND WEAK SOUND

Substitute V4 and check components.

SOUND BUT NO PICTURE

Check by substitution V8 and V14. Check associated components.

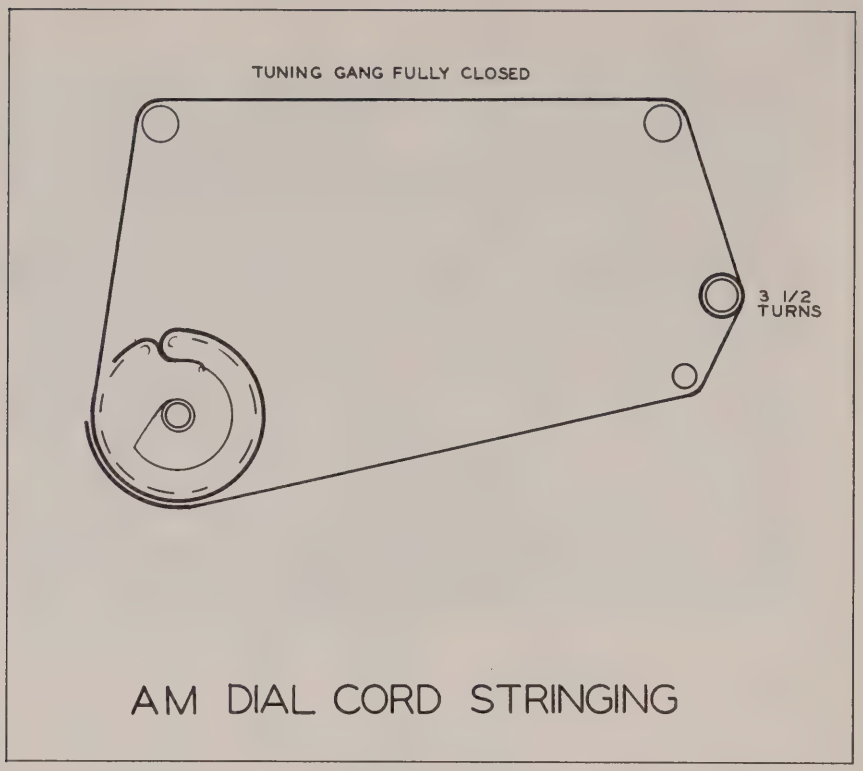
SNOWY PICTURE, GOOD SOUND

Substitute V1 and check components.

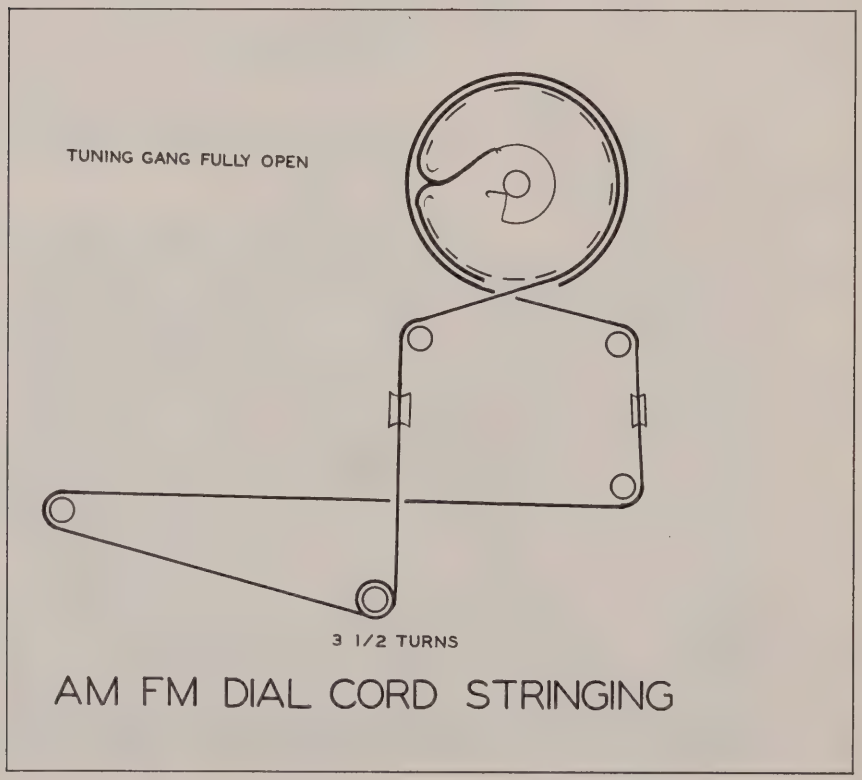
INTERMITTANT STREAKS

Check high voltage circuit for corona discharge and arcing. This may best be done by looking for a blue glow in the dark.

The Trouble - Shooting photographs shown above are made with permission of transmitting station WFBM-TV and in no way reflect the quality of the transmitted picture. Similarly, symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.



AM DIAL CORD STRINGING



AM FM DIAL CORD STRINGING

DISASSEMBLY INSTRUCTIONS

PROPERTY OF
F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

DISASSEMBLY FOR MODEL 21-T-242

TV

1. Remove 8 push on type control knobs from front panel.
2. Remove 6 wood screws. Remove rear cover from radio compartment.
3. Disconnect TV input from rear of radio chassis.
4. Remove 3 wood and 2 metal screws. Remove rear cover to TV compartment.
5. Disconnect speaker lead from terminal board on Radio.
6. Disconnect built-in antenna and transmission leads, yoke plug, HV lead, CRT socket and yoke ground strap.
7. Remove 5 chassis bolts. Remove TV chassis.

RADIO

1. Remove 6 push on type control knobs from front panel.
2. Rear cover removed above.
3. Disconnect phono motor and pickup leads, speaker leads, and antenna lead.
4. Remove 1 wood screw holding AC line cord bracket. Remove bracket.
5. Remove 2 wood screws. Remove radio chassis.

DISASSEMBLY FOR MODEL 21-T-244

TV

1. Remove 9 push on type control knobs from front panel.
2. Disconnect TV AC plug. Remove 3 wood and 2 metal screws. Remove rear cover.
3. Disconnect built-in antenna and transmission line, yoke plug, HV lead, speaker leads and yoke bracket ground strap, radio speaker leads, and audio output plug.
4. Remove 5 chassis bolts. Remove TV chassis.

RADIO

1. Remove 5 push on type control knobs from front panel.
2. Remove 6 wood screws. Remove rear cover.
3. Disconnect FM antenna, audio output plug, phono motor and pickup leads, power supply plug and and FM and AM antenna plugs.
4. Remove 4 chassis bolts. Remove audio output chassis.
5. Disengage dial cord from indicator. Remove 4 chassis bolts. Remove radio chassis.
6. Remove 3 speaker nuts. Remove speaker.

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MODEL C-2112A

RAYTHEON MODELS C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3)

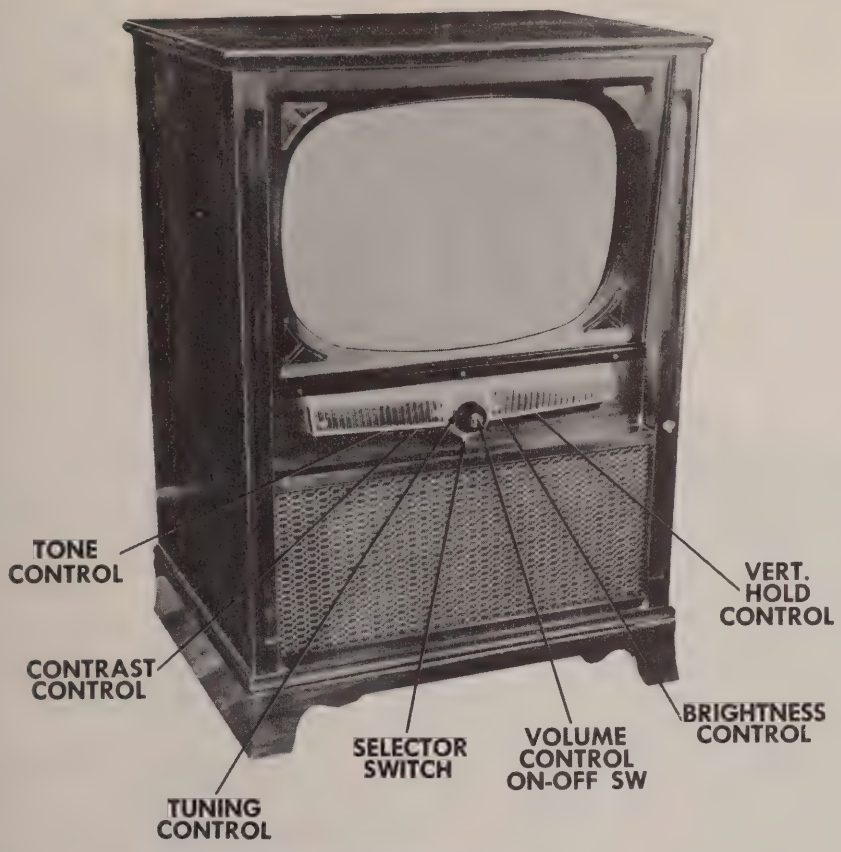
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 5-53 SET 202 FOLDER 7

PHOTOFACT* Folder

RAYTHEON MODELS C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3)



RAYTHEON MODEL C-2112A

TRADE NAME	Raytheon Models C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, RC-2117A, C-2118A (Ch. 21T3)
MANUFACTURER	Raytheon Television & Radio Corp., 5921 W. Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Twenty-Nine
POWER SUPPLY	110-115 Volts AC-60 Cycle RATING 2.18 Amp @ 117 Volts AC
TUNING RANGE	TV Channels 2 thru 13 (VHF), 14 thru 83 (UHF), Video IF 26.75MC, TV Sound IF 22.25MC, AM 540-1600KC, AM IF 455KC

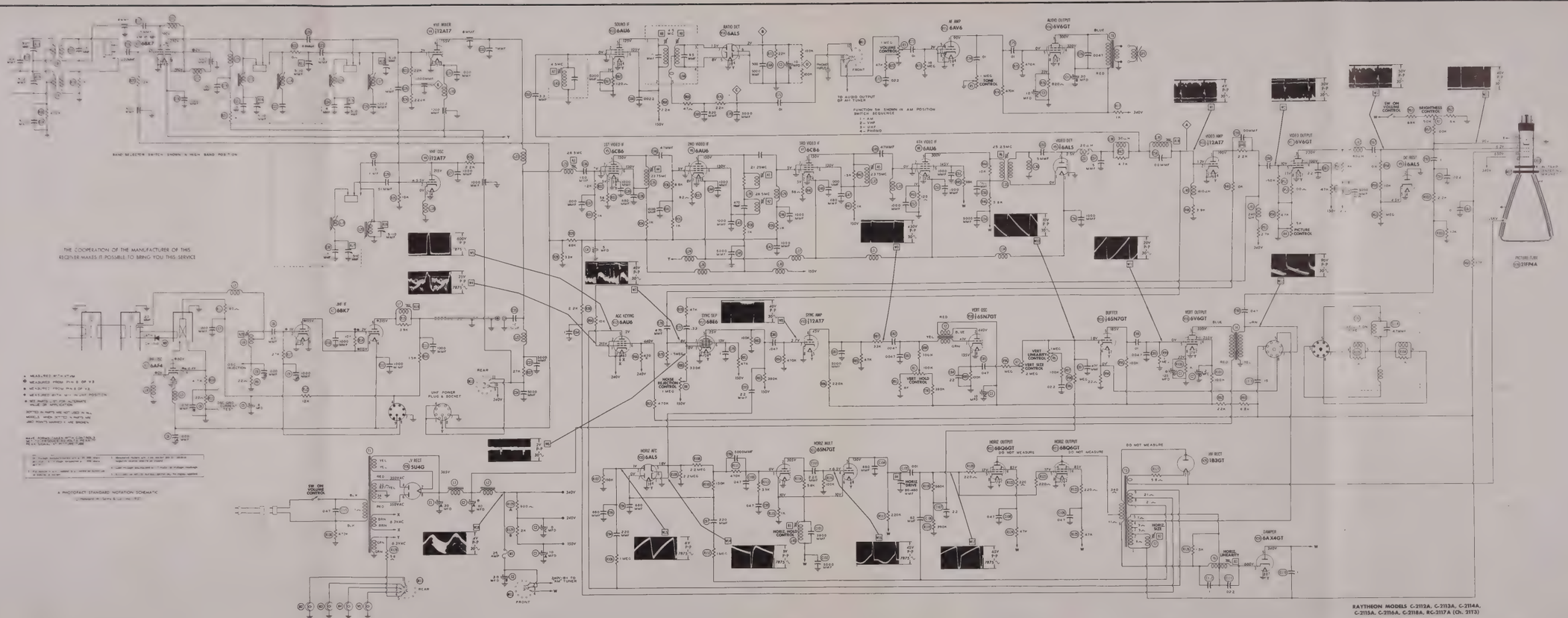
INDEX

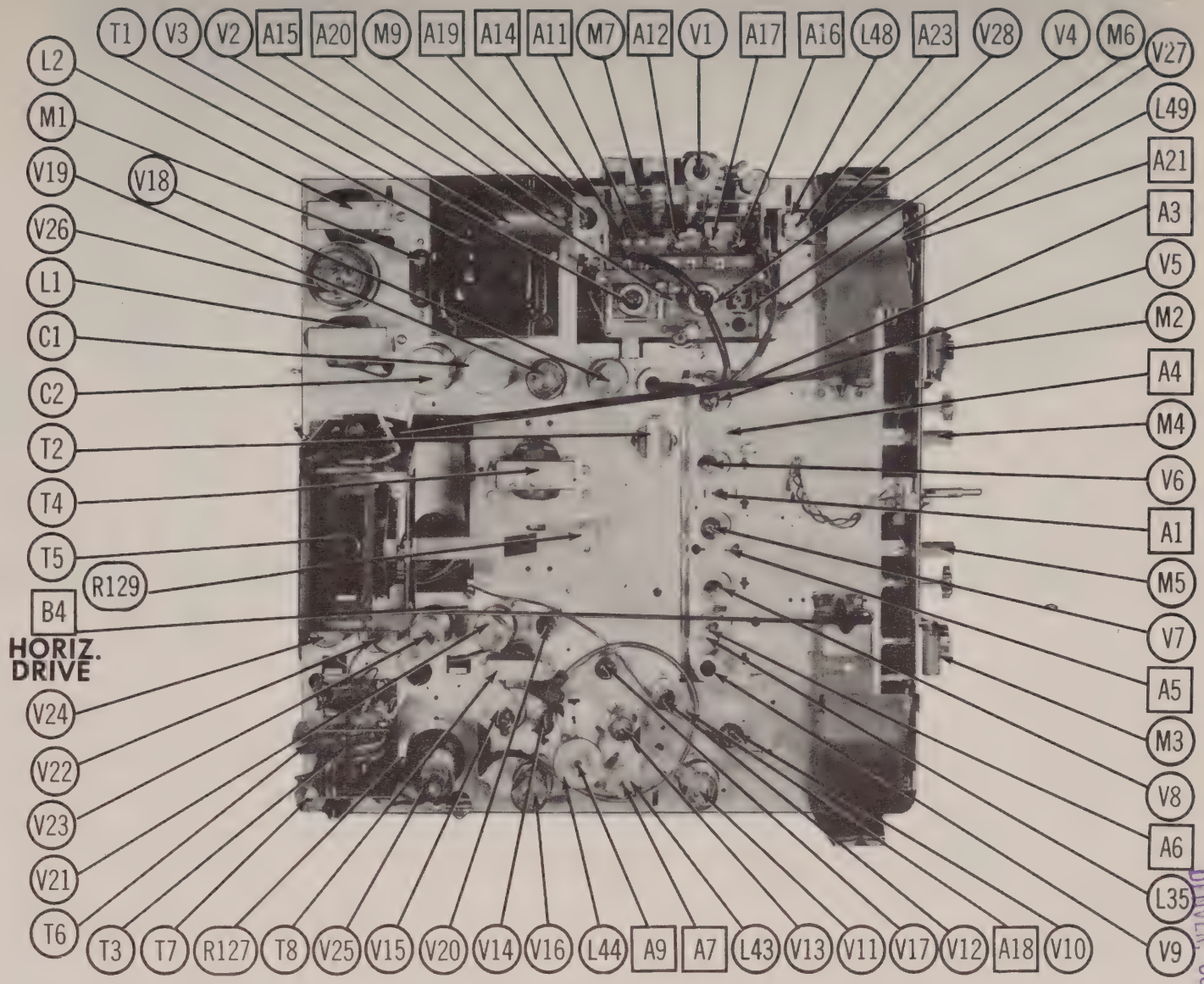
Alignment Instructions 6, 7
Drive Cord Stringing 21
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet-Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Photographs (Cont)
Resistor and Inductor Identification 19, 20
Resistance Measurements 8
Servicing in the Field 18
Schematic (TV) 2
Schematic (Radio) 10
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

RAYTHEON MODELS C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

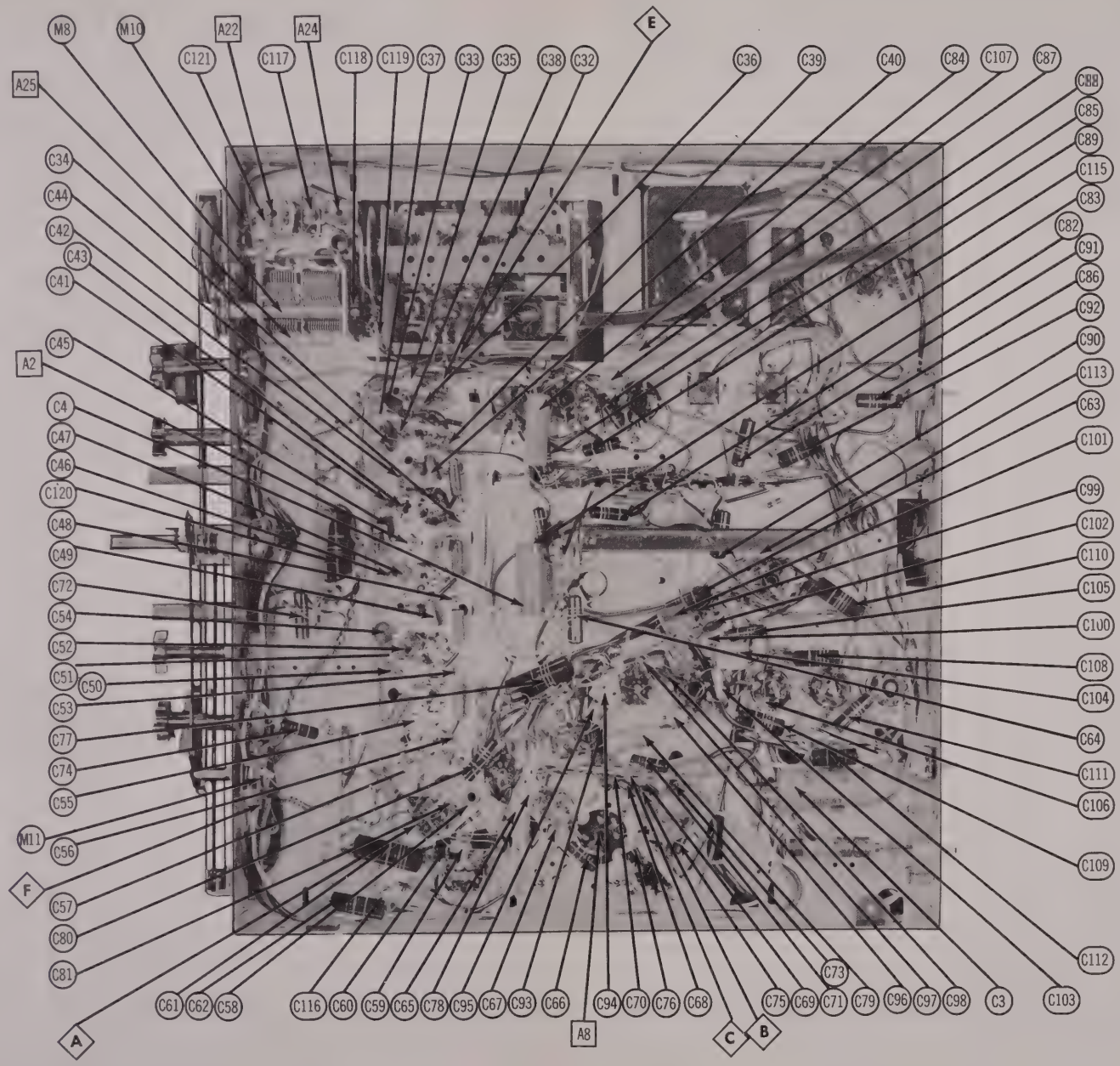
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
RAYTHEON MODELS C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 2113)



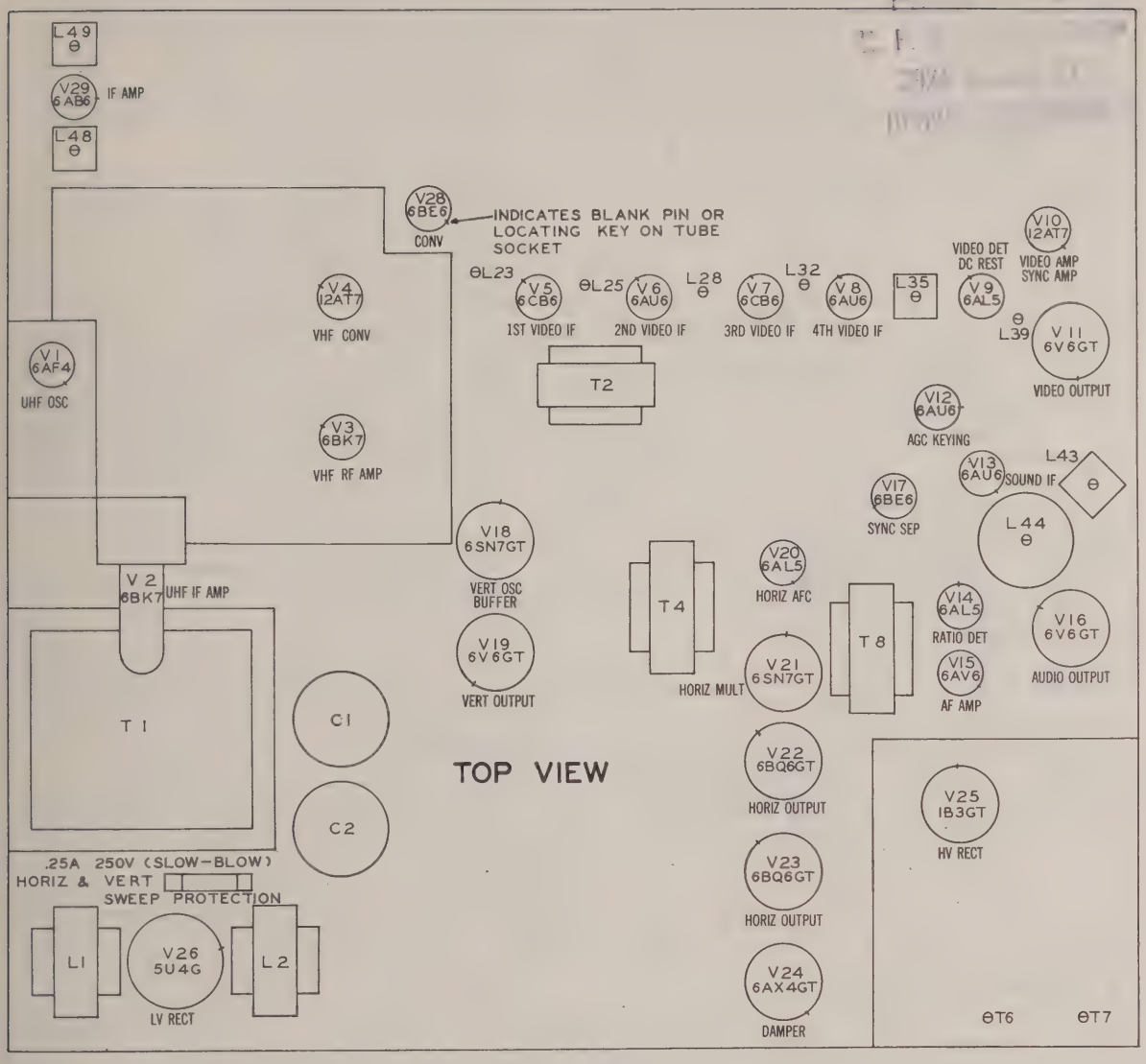
CHASSIS TOP VIEW

DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V26

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V4, V5, V6, V7, V8, V9 (V1, UHF only)
No pic, no sound, has snow-V3, V4, V5
No pic, has sound, has raster-V10, V11, V 29
Has pic, no sound-V13, V14, V15, V16
Overloaded picture-V12

SYNC FAILURE
No vert. sync-V10, V18
No horiz. sync-V17, V20, V21
No vert. or horiz. sync-V17

SWEEP FAILURE
No raster, has sound-V21, V22, V23, V24, V25, V29 Fuse (M1)
No vertical deflection-V18, V19
Poor vert. linearity or foldover -V18, V19
Poor horiz. linearity or foldover-V21, V 22, V23, V24
Narrow picture-V21, V22, V23, V24, V25, V26
Vert. off freq. -V10, V18
Horiz. off freq. -V17, V20, V21

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube to disable the high voltage.

VIDEO IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 7 (grid) of 12AT7 (V4). Low side to chassis. Use short leads.	21.25MC (Unmod)	Any high band channel.	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator to maintain 2 volts at VTVM.
2.	"	"	26.5MC	"	"	A2	Adjust for maximum deflection. Repeat step 1.
3.	"	"	"	"	"	A3	Adjust for maximum deflection.
4.	"	"	23.75MC	"	"	A4, A5	"
5.	"	"	25.25MC	"	"	A6	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.001MFD	High side to pin 7 (grid) of 12AT7 (V4). Low side to chassis. Use short leads.	24MC (10MC Swp)	23.5MC 26.75MC	Any high band channel.	Vert. amp. to point (A). Low side to chassis.		Check for response similar to Fig. 1. If necessary retouch A1 thru A6 for desired response. Keep generator output low to avoid distortion of response curve.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Short the antenna input to chassis.
Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistor is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6AU6 (V13). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A7, A8	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C). Common to point (D).	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Short the antenna input to chassis.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of 6AU6 (V13). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point (B). Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C3B. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
8.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A9	Reconnect capacitor C3B. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

TUNER ALIGNMENT

Preset the trimmer screws as in Fig. 4.
Turn the tuner to the top of its stroke in low band position.
Adjust the coil cores so that bottoms of cores are 1.6 inch above bottoms of coil forms.

LOW BAND RF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. amp. to point (E). Low side to chassis.	A10, A11, A12	Adjust for maximum response as in Fig. 5.
10.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"		Check for response similar to Fig. 5. If necessary retouch A11 and A12 for nearest approach to Fig. 5 response on all low band channels.
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

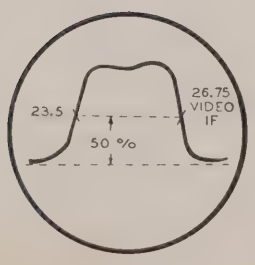


FIG. 1

FIG. 2

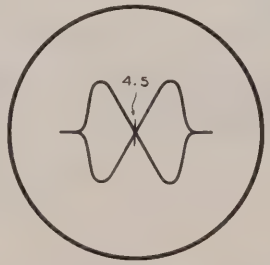


FIG. 3

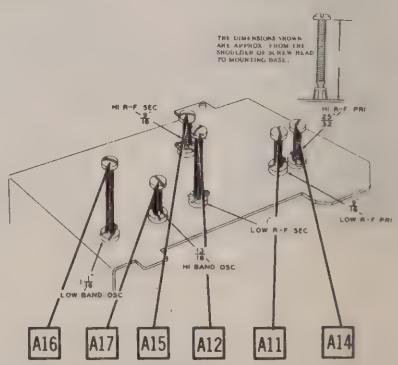


FIG. 4

TV ALIGNMENT INSTRUCTIONS (CONT.)

HIGH RF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point (E). Low side to chassis.	A13, A14, A15	Adjust for maximum response as in Fig. 5.
12.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check for response similar to Fig. 5. If necessary retouch A14 and A15 for nearest approach to Fig. 5 response on all high band channels.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	85MC (10MC Swp)	83.25MC	6	Vert. amp to point (A) Low side to chassis.	A16	Adjust to place video marker at 50% on low frequency slope of response as in Fig. 6.
14.	"	"	69MC (10MC Swp)	67.25MC	4	"		Check for marker placement as in Fig. 6. If necessary make slight compromise adjustment of A16 for best marker placement on low band channels.
			57MC (10MC Swp)	55.25MC	2			
15.	"	"	213MC (10MC Swp)	211.25MC	13	"	A17	Adjust to place video marker at 50% on low frequency slope of response as in Fig. 6.
16.	"	"	195MC (10MC Swp)	193.25MC	10	"		Check for marker placement as in Fig. 6. If necessary make slight compromise adjustments of A17 for best marker placement on high band channels.
			177MC (10MC Swp)	175.25MC	7			

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the fine tuning control until sound bars just appear in the picture.
Starting with A18 all the way out adjust clockwise for minimum sound bars in picture.

UHF TUNER

The cascode pre-IF amplifier can be aligned, if necessary, by connecting a 25MC unmodulated signal to the center tap of L6 and the DC probe of a VTVM to point (A). Adjust A19 and A20 for maximum deflection on VTVM.
In the event of dial cord replacement or component replacement, the RF cavities may be adjusted for peak performance. Tune to a UHF program, loosen the pulley positioning screw (Fig. 7) and rotate the RF drive pulleys for best picture. Tighten the positioning screw.
Complete realignment of the UHF tuner involves the use of precision UHF test equipment and should not be attempted in the field.

RADIO ALIGNMENT INSTRUCTIONS

RADIO ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
17.	.1MFD	High side to pin 7 (grid) of 6BE6 (V28). Low side to chassis.	455KC (Unmod)	AM	Tuning gang fully open.	DC probe to point (F) Common to chassis.	A21, A22, A23, A24	Adjust for maximum deflection.
18.	"	"	1620KC	"	"	"	A25	"
19.		Loop	1400KC	"	Tune to 1400KC signal	"	A26	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

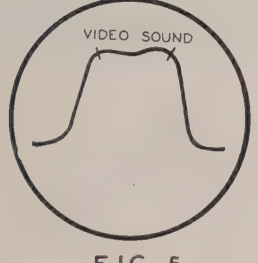


FIG. 5

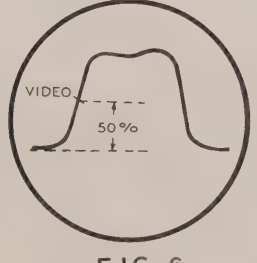


FIG. 6

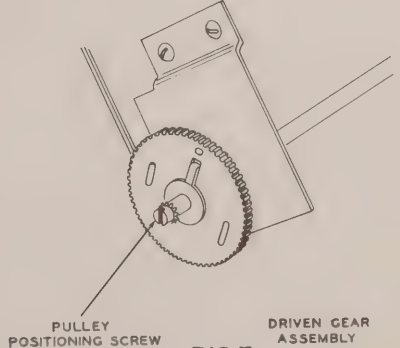
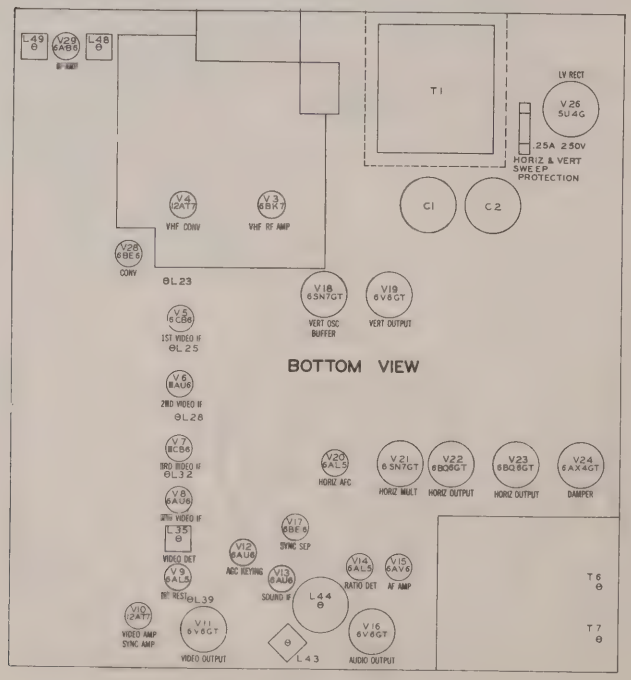


FIG. 7

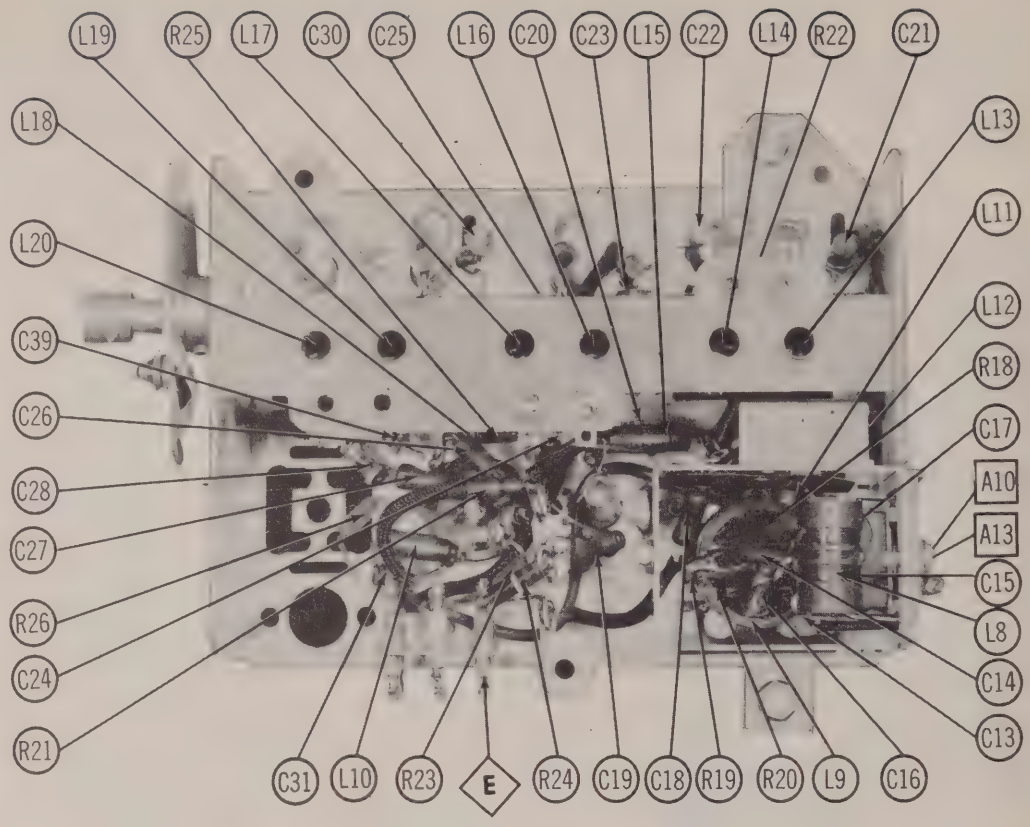
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	♦ † 13.2KΩ	4.7KΩ	.1Ω	0Ω	.1Ω	4.7KΩ	♦† 13.2KΩ		
V 2	6BK7	INF	60KΩ	0Ω	.1Ω	0Ω	♦ † 2.5KΩ	INF	INF	0Ω
V 3	6BK7	INF	43KΩ	0Ω	0Ω	.1Ω	† 2KΩ	INF	INF	0Ω
V 4	12AT7	3.2KΩ	10KΩ	2.2Ω	0Ω	0Ω	† 28KΩ	240KΩ	0Ω	.1Ω
V 5	6CB6	100KΩ	56Ω	0Ω	.1Ω	†3.9KΩ	† 3.9KΩ	0Ω		
V 6	6AU6	100KΩ	0Ω	0Ω	.1Ω	† 3.9KΩ	† 3.9KΩ	82Ω		
V 7	6CB6	100KΩ	56Ω	0Ω	.1Ω	† 3.9KΩ	† 3.9KΩ	0Ω		
V 8	6AU6	.2Ω	0Ω	0Ω	.1Ω	† 5.9KΩ	† 68KΩ	120Ω		
V 9	6AL5	.8Ω	0Ω	.1Ω	0Ω	1Meg	0Ω	3.9KΩ		
V 10	12AT7	†6KΩ	3.9KΩ	0Ω	.1Ω	.1Ω	47KΩ	470KΩ	0Ω	0Ω
V 11	6V6GT	0Ω	0Ω	†2.8KΩ	†50KΩ	150KΩ	† 2.5KΩ	.1Ω	820Ω	
V 12	6AU6	12KΩ	† 975Ω	¶.1Ω	¶0Ω	100KΩ	470KΩ	† ¶75Ω		
V 13	6AU6	3.5Ω	0Ω	0Ω	.1Ω	† 5KΩ	†5KΩ	120Ω		
V 14	6AL5	22KΩ	0Ω	0Ω	.1Ω	INF	0Ω	INF		
V 15	6AV6	10Meg	0Ω	0Ω	.1Ω	0Ω	0Ω	† 470KΩ		
V 16	6V6GT	0Ω	0Ω	† 1.5KΩ	† 1KΩ	470KΩ	† 1KΩ	.1Ω	820Ω	
V 17	6BE6	† 600KΩ	0Ω	0Ω	.1Ω	†90KΩ	† 470KΩ	†1.5Meg		
V 18	6SN7GT	170KΩ	■29KΩ	100KΩ	1.4Meg	■130KΩ	16Ω	.1Ω	0Ω	
V 19	6V6GT	INF	.1Ω	† 1KΩ	■130KΩ	1Meg	390KΩ	0Ω	1KΩ	
V 20	6AL5	2.2Meg	150KΩ	0Ω	.1Ω	2.2Meg	0Ω	4.5Meg		
V 21	6SN7GT	5Meg	† 5.6KΩ	1KΩ	100KΩ	† 220KΩ	1KΩ	0Ω	.1Ω	
V 22	6BQ6GT	950KΩ	.1Ω	† 47KΩ	† 47KΩ	950KΩ	390KΩ	0Ω	0Ω	TOP CAP ■17Ω
V 23	6BQ6GT	1.5Meg	.1Ω	1Meg	†47KΩ	950KΩ	† 47KΩ	0Ω	0Ω	TOP CAP ■17Ω
V 24	6AX4GT	INF	INF	150KΩ	INF	† 76Ω	INF	.1Ω	0Ω	
V 25	1B3GT	PINS 1 THRU 8 HAVE INF RESISTANCE								TOP CAP ■357Ω
V 26	5U4G	INF	60KΩ	INF	32.2Ω	470KΩ	34Ω	470KΩ	60KΩ	
V 27	6BE6	47KΩ	.3Ω	0Ω	‡ .1Ω	‡ †13KΩ	‡† 13KΩ	‡2.2Meg		
V 28	6BA6	‡	0Ω	0Ω	‡ .1Ω	‡ †13KΩ	‡† 13KΩ	180Ω		
V 29	21FP4A	0Ω	1Meg	PIN 6 †76Ω	PIN 10 ■10KΩ	PIN 11 140KΩ	PIN 12 .1Ω			

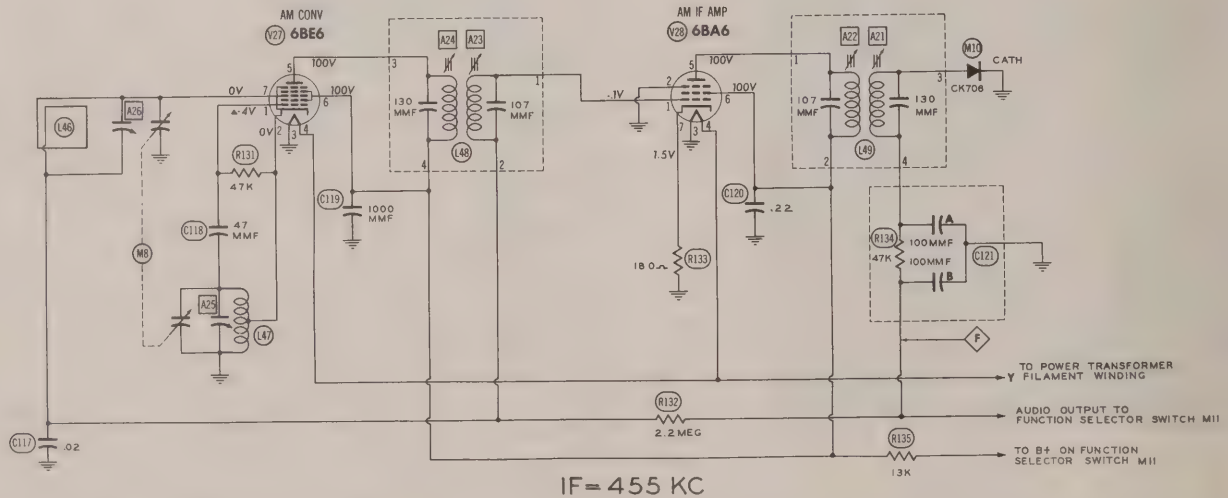
ALL MEASUREMENTS TAKEN IN "VHF" POSITION UNLESS OTHERWISE SPECIFIED.
† MEASURED FROM PIN 8 OF V26.
■ MEASURED FROM PIN 3 OF V24.
♦ MEASURED IN "UHF" POSITION.
‡ MEASURED IN "AM" POSITION.
¶ MEASURED FROM PIN 7 OF V12.



TUBE PLACEMENT CHART



RF TUNER



IF = 455 KC

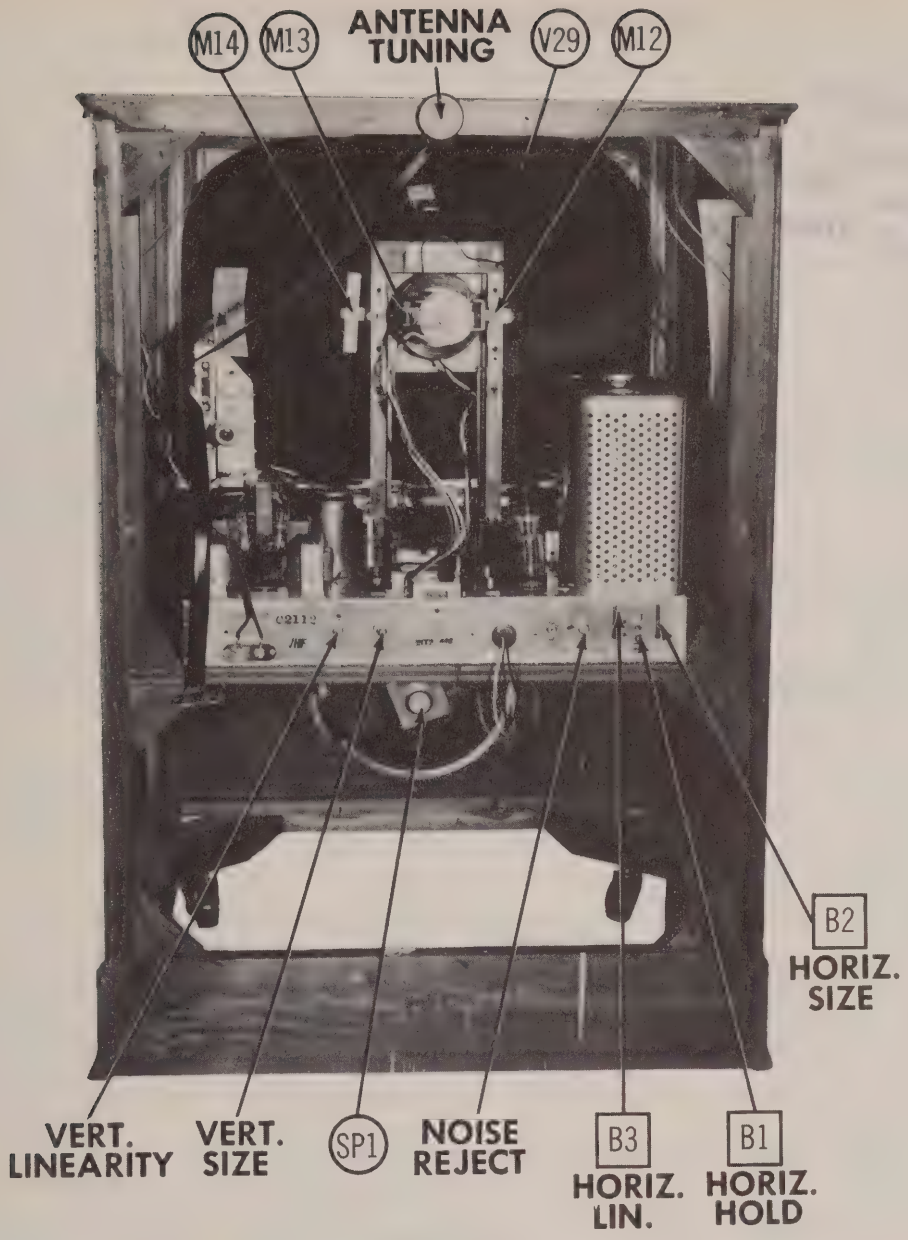
● ALL MEASURMENTS TAKEN WITH M11 IN AM POSITION

▲ MEASURED WITH VTVM

RAYTHEON MODELS C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953

RADIO SCHEMATIC



CABINET–REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the contrast control for normal contrast.

Turn the horizontal hold thumb screw clockwise until it reaches its stop, then counter clockwise 2 full turns.

The thumb screw is a vernier adjustment and should then be in the center of its range.

Adjust the horizontal hold slug (B1) until the picture synchronizes horizontally and make any further adjustment of B1 necessary to set it in the middle of its range of synchronization.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

Adjust the horizontal drive trimmer (B4) counter clockwise as far as possible without the presence of white vertical lines or compression of the center of the picture.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check horizontal winding of deflection yoke for open. Check C113 for open.

INSUFFICIENT SWEEP

Substitute V21, V22, V23 and V24.
Check setting of horizontal drive, width and horizontal linearity controls.
Check waveform at W17.

If Satisfactory	If Unsatisfactory
Check R122, R123, R124, R125 for change of values. Check C108, C109 and C110 for leakage or open. Check T3, T6 and T7.	Check C103, C104, C105 and C106 for leakage and open. Check R114, R115 and R117 for change of value.

DRIVE LINES

Substitute V22 and V23.
Check setting of Horizontal linearity, width and drive controls. Check C104 for leakage or change of value.

COMPRESSED AT LEFT SIDE

Substitute V21, V22, V23 and V24. Since V22 and V23 are operated in parallel both should be substituted at the same time.
Check T3. Check Horizontal Linearity Coil, T6.
Check C111 and C112.

FOLDS

Substitute V21, V22, V23 and V24.
Check C110, C111 and C112.
Check T3, T6 and T7.

XMAS TREE EFFECT

Check L45 for open and C101 for open. This trouble will be accompanied by a loud singing, at a high frequency, of the horizontal circuit.

VERTICAL

LOSS OF SWEEP

Substitute V18 and V19.
Check T2 and T4.
Check C82 and C88 for open.
Check yoke for open.

INSUFFICIENT SWEEP

Substitute V18 and V19.
Check C1D for open. Check C2D for open.
Check R101, R100, R92 and R93 for change of value.
Check waveform at W11.

If Satisfactory	If Unsatisfactory
Check the components associated with V19 that have not already been checked.	Check circuit and components of Vertical Oscillator, V18.

COMPRESSED AT BOTTOM

Substitute V18 and V19.
Check C1D and C2D for open.

COMPRESSED AT TOP

Substitute V18 and V19.
Check T4. Check R99 and C89.

FOLDS

Substitute V18 and V19.
Check C1D and C2D. Check T2 and T4.
Check yoke and vertical damping resistors R104 and R105

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V10, V17 and V20.
Check C93. Check other components associated with V10, V17 and V20.

CRITICAL SYNC

Substitute V10, V17 and V20.
Check C98, C99, C100, C94, C95, C96 and C97.

PULLING PICTURE

Substitute V10, V17 and V20.
Check C98, C99 and C100.

VERTICAL

LOSS OF SYNC:

Substitute V10, V17 and V18.
Check C80, C81, C82 and C83.
Check T2.

CRITICAL SYNC:

Substitute V10, V17 and V18. Proceed as outlined under LOSS OF SYNC, VERTICAL.

TRIGGERING:

Substitute V10, V17 and V18.
Check filament lead dress near V10, V17 and V18.

VIDEO

SOUND BARS:

Check setting of local oscillator and 4.5MC trap, A18, as outlined in the alignment chart.

POOR RESOLUTION:

Substitute V3, V4, V5, V6, V7 and V8.
Check alignment of the video IF stages.
Check components of the video IF strip.

POOR CONTRAST:

Substitute V3, V4, V5, V6, V7, V8, V9, V10 and V11.
Check C59, C60, C61 and C62.
Check picture tube.

SMEAR:

Substitute V9, V10 and V11.
Check C59, C60, C61 and C62 for leakage.
Check peaking coils L40, L41 and L42 for shorts and open.
Check R48, R50, R51 and R56 for change of value.

ONE WIDE BLACK BAR ACROSS PICTURE:

Check RF tuner video IF, video detector and video amplifier for heater to cathode leakage.

PARTS LIST AND DESCRIPTIONS

PROFESSIONAL
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	UHF Oscillator	6AF4	6AF4		
V2	UHF IF Amplifier	6BK7	6BK7	9AJ	
V3	VHF RF Amplifier	6BK7	6BK7	9AJ	
V4	VHF Converter	12AT7	12AT7	9A	
V5	1st. Video IF Amp.	6CB6	6CB6	7CM	
V6	2nd. Video IF Amp.	6AU6	6AU6	7BK	
V7	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V8	4th. Video IF Amp.	6AU6	6AU6	7BK	
V9	Video Detector-DC Restorer	6AL5	6AL5	6BT	
V10	Video Amplifier-Sync Amplifier	12AT7	12AT7	9A	
V11	Video Output	6V6GT	6V6GT	7S	
V12	AGC Keying	6AU6	6AU6	7BK	
V13	Sound IF Amp.	6AU6	6AU6	7BK	
V14	Ratio Detector	6AL5	6AL5	6BT	
V15	AF Amplifier	6AV6	6AV6	7BT	
V16	Audio Output	6V6GT	6V6GT	7S	
V17	Sync Separator	6BE6	6BE6	7CH	
V18	Vert. Oscillator-Buffer	6SN7GT	6SN7GT	8BD	
V19	Vert. Output	6V6GT	6V6GT	7S	
V20	Horiz. AFC	6AL5	6AL5	6BT	
V21	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V22	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V23	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V24	Damper	6AX4GT	6AX4GT	4CG	
V25	HV Rectifier	1B3GT	1B3GT	3C	
V26	LV Rectifier	5U4G	5U4G	5T	
V27	Converter	6BE6	6BE6	7CH	
V28	IF Amplifier	6BA6	6BA6	7BK	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V29	21FP4A	21FP4A 21FP4 ①		12C 12C	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲30	450	8C-21449	AFH4-82		D057		FP376, 8 TC2501	TVL-4725	
B	■30	450								
C	▲10	450								
D	125	25								
C2A	▲60	450	8C-21450	AFH3-40 PRS450/4		C031 BR245			R1301	Note 1, Note 2.
B	■30	450								
C	▲10	450								
D	2	450								
C3A	10	450	8C-21169	PRS450/10-10 PRS25/10		C024		TCD72 TC22	R1300	Red, Blue, Yellow.
B	10	75								
C	10	25								
C4	5	450	8C-20557	PRS450/4		BR445		TC70	TVA-1702	
C5	8	450	8C-13453	PRS450/8		BR845A		TC71	TVA-1704	
C6A	1000		8G-19506	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C7	1000		8G-20878				GP1K-470	UC-5447	5GA-Q47	
C8	47		8G-20740	BPD-000047	D6-470					
C9A	1000		8G-19506	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C10	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C11	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C12	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C13	22		8G-11892		TCN-22		N750K-220		5TCU-Q22	
C14	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C15	1.5		8G-12495-8	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C16	220		8G-16045	SI220	D6-220		GP2K-221	UC-5322	5GA-T22	
C17	1.5		8G-12495-8	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C18	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C19	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C20	.68		8G-12495-1		TCZ-.68		NP0K-R68			
C21	15		8G-13017	SI15NP0	TCZ-15		NP0K-150	ZT-5415	5TCC-Q15	
C22	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C23	1.5		8G-12495-8	SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C24	4		8G-19314		TCZ-4		NP0K-040			
C25	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C26	1		8G-12495-2		TCZ-1		NP0K-010		5TCCB-V1	
C27	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C28	2.5		8G-19568							
C29	51		8G-11891							
C30	7		8G-15224							
C31	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C32	7		8G-11790							
C33	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C34	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	10		8G-12199	SI10	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	
C36	100	500	8F3-8	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C37	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C38	680		8G-21105	D6-681	D6-681		GP2K-681	UC-5368	5GA-T68	
C39	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C40	47	500	8F3-109	1468-00005	D6-470	5W5Q5	GP1K-470	MC225	1FM-45	
C41	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C42	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C43	1000		8G-20754	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C44	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C45	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C46	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C47	680		8G-21105	SI680	D6-681		GP2K-681	UC-5368	5GA-T68	
C48	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C49	47	500	8F3-109	1468-00005	D6-470	5W5Q5	GP1K-470	MC235	1FM-45	
C50	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C51	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C52	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C53	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C54	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C55	5		8G-12166	SI5NP0	TC2-4.7		NP0K-050	ZT-555	5TCCB-V47	
C56	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C57	5		8G-12166	SI5NP0	TC2-4.7		NP0K-050	ZT-555	5TCCB-V47	
C58	100	500	8F15-113	1469-0001		5R5T1		MCB235	MS-31	
C59	100	500	8F1-113	1469-0001		5R5T1		MCB235	MS-31	
C60	.1	400	8J-16083	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C61	.22	400	8J-16095	P488-22		PTE4P22		PT4025	4TM-P22	
C62	.1	400	8J-16083	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C63	.01	600	8J-16094	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C64	.1	200	8J-16085	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C65	3.3		8G-12495-5	SI3.3NP0	TC2-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	
C66	.0022	600	8J-20634	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C67	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C68	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C69	820	500	8F3-124							
C70	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C71	.01	400	8J-20582	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C72	.022	300	8J-16086	P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C73	.01	400	8J-20582	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C74	.01	400	8J-16097	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C75	.01	400	8J-16084	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C76	.0047	600	8J-20601	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C77	.33	200	8J-20586	P288-33						
C78	470	500	8J-13962	1469-0005		5R5T5		MCB345	MS-35	
C79	.1	400	8J-16085	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C80	.047	200	8J-16096	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C81	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C82	.0047	600	8J-20601	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C83	.0047	400	8J-20592	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C84	.22	200	8J-16082	P488-22		PTE4P22			2TM-P22	
C85	.047	200	8J-16081	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C86	.022	200	8J-16086	P488-022		PTE4S22		PT4122	4TM-S22	
C87	470	500	8J3-121	1469-0005		5R5T5		MCB345	MS-35	
C88	.01	400	8J-18084	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C89	.0047	400	8J-20592	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C90	.047	400	8J-16081	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C91	.022	200	8J-16086	P488-022		PTE4S22		PT4122	4TM-S22	
C92	.1	200	8J-16085	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C93	22		8G-11892		TCN-22		N750K-220		5TCU-Q22	
C94	220	500	8F3-117	1469-00025		5R5T25		MCB340		
C95	680	500	8F3-123	1479-0007		2R5T7			MS-37	
C96	680	500	8F3-123	1479-0007		2R5T7			MS-37	
C97	220	500	8F3-117	1469-00025		5R5T25		MCB340		
C98	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C99	.047	200	8J-16096	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C100	.047	200	8J-16096	P288-047	DF-503	PTE4S47		PT4147	2TM-S47	
C101	3900	500	8F11-132	1464-004		1DR5D4		MCB463	MS-24	
C102	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C103	220	500	8F3-117	1469-00025		5R5T25		MCB340		
C104	680	500	8F3-123	1479-0007		2R5T7			MS-37	
C105	.001	400	8J-20588	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C106	62	500	8G-20137							
C107	.22	200	8J-16082	P488-22		PTE4P22		PT4025	2TM-P22	
C108	.047	400	8J-16081	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C109	.047	400	8J-16081	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C110	.1	400	8J-16083	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C111	.022	200	8J-16086	P488-022		PTE4S22		PT4122	2TM-S22	
C112	.1	200	8J-16083	P288-1		PJ2P1		PT401	2TM-P1	
C113	.15	200	8J-20585	P288-15		PTE4P15		TP417	2TM-P15	
C114	47									
C115	.047	400	8J-16081	489ZX-05		PJ4S47		PT4147	4TM-S47	
C116	5000		8G-13962	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	Note 3.
C117	.02	200	8G-17288	P488-02	DF-203	PTE4S2		PT412	2TM-S2	
C118	47		8G-12198	SH47N750	TCN-47		N750K-470	NT-5447	5TCU-Q47	
C119	1000		8G-13201	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C120	.22	400	8J-16095	P488-22		PTE4P22		PT4025	4TM-P22	
C121A	100	}	† 20I-15005	SI100	† PC-50	TM5T1	† 1403-01	UC-531	† 10IC1	
B	100	}		SI100		TM5T1		UC-531		

Note 1: Some models use 30MFD in this application.
Note 2: Some models use 60MFD in this application.
Note 3: Not used in all models.
†: Items C121A, C121B, R134 are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	[illegible]	½	A-10B-17225	QU-128	AG-49-S	AB-40	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	50K	½	A-10B-17764	QU-123	AG-44-S	AB-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	1Meg	½	A-10A-21217		AT-103		UT-440	Volume-Tapped ② 125KΩ
B	Shaft		Not Req.		FS-5		DS-36	Attach to R3A
C	Switch		Not Req.		SW-A2		US-27	Attach to R3A
R4A	500Ω	½	A-10B-17765	QU-114	AG-19-S	AB-12	U-14	Picture
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	1Meg	½	A-10B-19542	QU3-137	AG-63-Z	BSK-70	U-53	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R5A
R6A	1Meg	½	A-10B-19296	QU-137	AG-61-S	AB-69	SU-54	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-L 4	AK-1	Not Req.	Attach to R6A
R7A	2Meg	½	A-10B-20445	QU-139	AG-63-S	AB-75	SU-56	Vert. Size
B	Shaft		Not Req.	Not Req.	FKS-L 4	AK-1	Not Req.	Attach to R7A
R8A	1Meg	½	A-10B-19296	QU-137	AG-61-S	AB-69	SU-54	Noise Reject
B	Shaft		Not Req.	Not Req.	FKS-L 4	AK-1	Not Req.	Attach to R8A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R9	22Ω	½			
R10	4700Ω	½	9B1-70	BTS-4700	
R11	160Ω	½	9B1-140		
R12	12KΩ	3	9C11-1113	1 3/4A-12K	
R13	22Ω	½			
R14	10KΩ	½	9B1-74	BTS-10K	
R15	3900Ω	½	9B1-69	BTS-3900	
R16	1500Ω	½	9B1-64	BTS-1500	
R17	27KΩ	½	9B1-79	BTS-27K	
R18	470KΩ	½	9B1-29	BTS-470K	
R19	1000Ω	½	9B1-62	BTS-1000	
R20	10KΩ	½	9B1-74	BTS-10K	
R21	1000Ω	½	9B1-13	BTS-1000	
R22	10Ω	½	9B1-38		
R23	22KΩ	½	9B1-78		
R24	220KΩ	½	9B1-27		
R25	10KΩ	½	9B1-74	BTS-10K	
R26	2200Ω	½	9B1-66	BTS-2200	
R27	27KΩ	1	9B2-79		
R28	33KΩ	½	9B1-80	BTS-33K	
R29	68KΩ	½	9B1-84	BTS-68K	
R30	2200Ω	½	9B1-66	BTS-2200	
R31	1000Ω	½	9B1-13	BTS-1000	
R32	12KΩ	½	9B1-75		
R33	56Ω	½	9B1-47		
R34	1000Ω	½	9B1-13	BTS-1000	
R35	1000Ω	½	9B1-13	BTS-1000	
R36	6800Ω	½	9B1-72		
R37	82Ω	½	9B1-49	BTS-82	
R38	1000Ω	½	9B1-13	BTS-1000	
R39	1000Ω	½	9B1-13	BTS-1000	
R40	56Ω	½	9B1-47		
R41	1000Ω	½	9B1-13	BTS-1000	
R42	15KΩ	½	9B1-76	BTS-15K	
R43	120Ω	½	9B1-51	BTS-120	
R44	10KΩ	½	9B1-74	BTS-10K	
R45	68KΩ	1	9B2-84	BTA-68K	
R46	5600Ω	½	9B1-71	BTS-5600	
R47	4700Ω	½	9B1-70	BTS-4700	
R48	3900Ω	½	9B1-69	BTS-3900	
R49	10KΩ	½	9B1-74	BTS-10K	
R50	2200Ω	½	9B1-66	BTS-2200	
R51	2700Ω	½	9B1-67	BTS-2700	
R52	150KΩ	½	9B1-88	BTS-150K	
R53	100Ω	½	9B1-50	BTS-100	
R54	4700Ω	½	9B1-70	BTS-4700	
R55	47KΩ	1	9B2-82	BTA-47K	
R56	1800Ω	2	9B4-65	BTB-1800	
R57	100KΩ	½	9B1-86	BTS-100K	
R58	10KΩ	½	9B1-74	BTS-10K	
R59	10KΩ	½	9B1-74	BTS-10K	
R60	10KΩ	½	9B1-74	BTS-10K	
R61	68KΩ	½	9B1-84	BTS-68K	
R62	15KΩ	½	9B1-76	BTS-15K	
R63	1Meg	½	9B1-98	BTS-1Meg	
R64	10KΩ	½	9B1-74	BTS-10K	
R65	470KΩ	½	9B1-94	BTS-470K	
R66	470KΩ	½	9B1-94	BTS-470K	
R67	120Ω	½	9B1-51	BTS-120	
R68	2200Ω	½	9B1-66	BTS-2200	
R69	47Ω	½	9B1-46		
R70	22KΩ	½	9B1-78	BTS-22K	
R71	22KΩ	½	9B1-78	BTS-22K	
R72	47KΩ	½	9B1-82	BTS-47K	
R73	10Meg	½	9B1-37	BTS-10Meg	
R74	470KΩ	½	9B1-29	BTS-470K	
R75	470KΩ	½	9B1-29	BTS-470K	
R76	820Ω	1	9B2-61	BTA-820	
R77	1000Ω	5		1 3/4A-1000	
R78	47KΩ	½	9B1-82	BTS-47K	
R79	1.5Meg	½	9B1-100	BTS-1.5Meg	
R80	330KΩ	½	9B1-92	BTS-330K	
R81	47KΩ	1	9B2-82	BTA-47K	
R82	390KΩ	½	9B1-93	BTS-390K	
R83	100KΩ	½	9B1-86	BTS-100K	
R84	470KΩ	½	9B1-94	BTS-470K	
R85	47KΩ	½	9B1-82	BTS-47K	
R86	220KΩ	1	9B2-90	BTA-220K	
R87	33KΩ	½	9B1-80	BTS-33K	
R88	100KΩ	½	9B1-86	BTS-100K	
R89	100KΩ	½	9B1-86	BTS-100K	
R90	390KΩ	½	9B1-93	BTS-390K	
R91	18KΩ	½	9B1-77	BTS-18K	
R92	22KΩ	2	9B4-78	BTB-22K	
R93	6800Ω	1	9B2-72	BTA-6800	
R94	22Ω	½	9B1-42		
R95	100KΩ	½	9B1-86	BTS-100K	
R96	1Meg	½	9B1-98	BTS-1Meg	
R97	100KΩ	½	9B1-86	BTS-100K	
R98	1Meg	½	9B1-98	BTS-1Meg	
R99	1Meg	½	9B1-98	BTS-1Meg	
R100	10ΩΩ	½	9B1-62	BTS-1000	
R101	100KΩ	½	9B1-86	BTS-100K	
R102	2200Ω	½	9B1-66	BTS-2200	
R103	10KΩ	½	9B1-74	BTS-10K	
R104	1000Ω	½	9B1-62	BTS-1000	
R105	1000Ω	½	9B1-62	BTS-1000	
R106	1Meg	½	9B1-98	BTS-1Meg	
R107	150KΩ	½	9B1-88	BTS-150K	
R108	2.2Meg	½	9B1-102	BTS-2.2Meg	
R109	2.2Meg	½	9B1-102	BTS-2.2Meg	
R110	150KΩ	½	9B1-88	BTS-150K	
R111	470KΩ	½	9B1-94	BTS-470K	
R112	1Meg	½	9B1-98	BTS-1Meg	
R113	33KΩ	½	9B1-80	BTS-33K	
R114	5600Ω	1	9B2-71	BTA-5600	
R115	1000Ω	½	9B1-62	BTS-1000	
R116	100KΩ	½	9B1-86	BTS-100K	
R117	220KΩ	½	9B1-90	BTS-220K	
R118	560KΩ	½	9B1-95	BTS-560K	
R119	390KΩ	½	9B1-93	BTS-390K	
R120	220Ω	½	9B1-54		
R121	220Ω	½	9B1-54	"	
R122	220Ω	½	9B1-54		
R123	220Ω	½	9B1-54		
R124	47KΩ	2	9B4-82	BTB-47K	
R125	47KΩ	2	9B4-82	BTB-47K	
R126	1500Ω	1	9B2-64	BTA-1500	
R127	5.6Ω		9C1-1072		
R128	5.6Ω		9C1-1072		
R129A	900Ω	15	9M-21448		
B	2000Ω	10			
R130	470KΩ	½	9B1-94	BTS-470K	
R131	47KΩ	½	9B1-82	BTS-47K	
R132	2.2Meg	½	9B1-33	BTS-2.2 Meg	
R133	180Ω	½	9B1-53	BTS-180	
R134	47KΩ	½	†20I-15005	BTS-47K	
R135	13KΩ	10	9C-20019	1 3/4A-13.5K	

† Items R134, C121A, C121B are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.
T1	115VAC ⓐ 2.18A	700VCT .250ADC	5VAC ⓐ 3A	6.3VAC ⓐ .28A SEC. 4	12A-21447	P-8189 ①	P-3078			
				6.3VAC ⓐ 11.5A						

① Parallel the two 6.3VAC 5 and 7 Amp. windings and use as SEC 4.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	160Ω	970Ω	B-12M-18241-1	A-8125	A-3003	TBQ-5	A-97X	208T2 ③	Vert. Osc. Trans.
T3	364.6Ω tap ① .6Ω, 3.6Ω	4.2Ω tap ⓐ 2.1 Ω SEC. 2	C201-2170						Horiz. Output Trans.
	6.6Ω, 13.6Ω, 24.6Ω	2.1Ω							
T4	1050Ω	13Ω	B-12C-19849	A-8112	A-3036	TSO-9	A-99X ①	204T2 ①	Vert. Output Trans.
T5A	12Ω		C201-21524	DY-8 ②	MDF-70 ②	TY-2 ②	Y-12 ②	206D1 ②	Horiz. Deflection Coils
B	68Ω								Vert. Deflection Coils
T6	6Ω tap ⓐ 2Ω		201-20186-1			TL-2		20IR5	Horiz. Lin. Coil
L7	0.2Ω		13M-18233			TW-1		20IR1	Width Coil

① Drill one new mounting hole.
② Use original deflection coil network.
③ Mount on top of chassis.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T8	7.4KΩ	3.5Ω	455Ω .55Ω	12C-21518	A-3336 ①	A-2931 ①	RO-13 ①	3-7X ①	

① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA RAYTHEON PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	10"	PM	3.5Ω	C18A-21442	10J11	10A31	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.250	38Ω	1.3HY	16A-17959	C-2326 ①	C-2991	TR-3300 ①	C-23X
L2	.250	38Ω	1.3HY	16A-17959	C-2326 ①	C-2991	TR-3300 ①	C-23X

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RAYTHEON PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L3	Fil. Choke	0Ω		16A-20469				
L4	Cathode Choke	0Ω		16A-20470				
L5	UHF IF Coupling	.8Ω		16A-20537				
L6	UHF IF Input Coil	0Ω		201-20482				
L7	UHF IF Output Coil	.8Ω		201-20483				Tapped.
L8	VHF Ant. Trans.	0ΩCT	0Ω	13E-20787				High Band.
L9	VHF Ant. Trans.	0ΩCT	0Ω	13E-21189				Low Band.
L10	Fil. Choke	.2Ω		16A-20777				
L11	Neutr. Coil	0Ω		13M-20781				
L12	RF Choke	0Ω		13M-20780				
L13	RF Coil	0Ω		13E-17140				High Band.
L14	RF Coil	0Ω		13E-12046				Low Band.
L15	RF Choke	.9Ω		16A-17128				
L16	Mixer Grid Coil	0Ω		13E-17140				High Band.
L17	Mixer Grid Coil	0Ω		13E-12046				Low Band.
L18	Cathode Choke	2.2Ω		201-15608	4626	19-3036		20 Microhenries.
L19	Osc. Coil	0Ω		13E-17140				High Band.
L20	Osc. Coil	0Ω		13D-12155				Low Band.
L21	RF Choke	.2Ω		16A-21656	4602	19-3001		1 Microhenry.
L22	RF Choke	2.2Ω		201-15608	4626	19-3036		20 Microhenries.
L23	1st Video IF	.2Ω		201-20782	6188▲			
L24	Fil. Choke	.2Ω		16A-17937	6175	19-3001		3 Microhenries.
L25	2nd Video IF	.1Ω		201-21550	6189 or 6171▲	19-1021▲		
L26	RF Choke	1.8Ω		16A-18676	4606		CLA	2.2 Microhenries.
L27	Fil. Choke	.2Ω		16A-17937	6175	19-3001		3 Microhenries.
L28	3rd Video IF	.2Ω		201-21521				Includes 15KΩ resistor 47MMF Cap.
L29	RF Choke	2.2Ω		201-15608	4626			20 Microhenries.
L30	RF Choke	1.8Ω		16A-18676	4606		CLA	2.2 Microhenries.
L31	Fil. Choke	.2Ω		16A-17937	6175	19-3001		3 Microhenries.
L32	4th Video IF	.2Ω		201-21550	6171▲	19-1021▲		
L33	RF Choke	2.2Ω		201-15608	4626	19-3036		20 Microhenries.
L34	Fil. Choke	.2Ω		16A-17937	6175	19-3001		3 Microhenries.
L35	5th Video IF	.6Ω	.6Ω	13B-19958				
L36	RF Choke	.2Ω		16A-17937	6175	19-3001		3 Microhenries.
L37	Series Peaking Coil	2.2Ω		201-15608	4626	19-3036		20 Microhenries.
L38	Series Peaking Coil	4.8Ω		16A-20021	4644	19-3125		130 Microhenries.
L39	4.5MC Trap	1.2Ω		201-21670	1470	20-1004		
L40	Shunt Peaking Coil	21Ω		16A-19365	4648			410 Microhenries.
L41	Shunt Peaking Coil	6.8Ω		16A-19485	6181	19-3250		240 Microhenries.
L42	Series Peaking Coil	3.8Ω		16A-21669	6177	19-3093		80 Microhenries.
L43	Sound IF	3.5Ω		13A-19514	1470-A▲			
L44	Ratio Det.	4Ω	.7ΩCT	13M-19643	8205†	17-3493		Tertiary winding - .4Ω
L45	Horiz. Osc.	80Ω		13D-19540	6210	19-1575		
L46	Loop Ant.	2Ω		13E-19823				
L47	Osc. Coil	6Ω		13D-21501				Tapped ⓐ .3Ω
L48	Input IF	14.5Ω	14.5Ω	13B-17731	12-C1	16-6758		
L49	Output IF	14.5Ω	14.5Ω	13B-17731	12-C2	16-6758		

† Use adaptor plate.
■ Add 10MMF capacitor externally.
▲ Enlarge mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA RAYTHEON PART No. FUSE	RAYTHEON PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG Slo-Blo	1/4A 125V	46B-18362	55F-18024	313.250 (3AG-1/4A-Slo-Blo)	353001	MDL 1/4	

C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A (Ch. 21T3)

RAYTHEON MODELS C-2112A,

PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					RAYTHEON PART No.		
M2	Bayonet	6-8	.15	Brown	46A-10793		Type #47
M3	Bayonet	6-8	.15	Brown	46A-10793		Type #47
M4	Bayonet	6-8	.15	Brown	46A-10793		Type #47
M5	Bayonet	6-8	.15	Brown	46A-10793		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M6	RF Tuner		VHF-Models C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, RC-2117A, C-2118A
M7	RF Tuner		UHF-Models C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, RC-2117A, C-2118A
M8	Tuning Capacitor	8A-19655	AM-Models C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, RC-2117A, C-2118A
M9	Crystal Diode	8M-21655	(CK-710) UHF Converter
M10	Crystal Diode	RAY CK-706	AM Detector
M11	Switch	20A-21271	Function Selector
M12	Centering Magnet	16M-20697	
M13	Ion Trap	16M-19906	
M14	Correction Magnet	16M-20872	(2 Used)
B4	Trimmer Capacitor	8E-18508	Horiz. Drive 80-480MMF
	Cabinet	24D-21243	For Model C-2112A
	Cabinet	24D-21517	For Model C-2113A
	Cabinet	24D-21473	For Model C-2114A
	Cabinet	24D-21474	For Model C-2115A
	Cabinet	24D-21475	For Model C-2116A
	Cabinet	24D-19395	For Model RC-2117A
	Cabinet	24D-21430-1	For Model C-2118A
	Back Assembly	200-21503	Models C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A
	Back Assembly	200-21503-1	Model RC-2117A
	Escutcheon	5C-21188-97	
	Mask	25M-21508-A102	For Models C-2112A, C-2113A, C-2114A, C-2115A
	Mask	25M-21508-1	For Model C-2116-A
	Mask	25M-21508-A104	For Model C-2118A
	Safety Glass	30M-21485	For all Models except RC-2117A
	Safety Glass	30M-21658	For Model RC-2117A
	Safety Glass Holder	2D-21257-A76	For Models C-2112A, C-2114A and RC-2117A
	Safety Glass Holder	2D-21257-A56	For Model C-2113A and C-2115A
	Safety Glass Holder	2D-21257-A103	For Model C-2116A
	Safety Glass Holder	2D-21257-A104	For Model C-2118A
	Knob	5B-21241-76	Tuning, For Models C-2112A, C-2114A, and RC-2117A
	Knob	5B-21241-56	Tuning, For Models C-2113A and C-2115A
	Knob	5B-21241-A103	Tuning, For Model C-2116A
	Knob	5B-21241-A104	Tuning, For Model C-2118A
	Knob	5B-21240-76	Off/On Volume, For Models C-2112A, C-2114A and RC-2117A
	Knob	5B-21240-56	Off/On Volume, For Model C-2113A and C-2115A
	Knob	5B-21240-A103	Off/On Volume, For Model C-2116A
	Knob	5B-21240-A104	Off/On Volume, For Model C-2118A
	Knob	5B-21273-29	Tone, Picture, Brightness, Vertical Hold (4 Used)
	Knob	5B-18382-36	Antenna

TROUBLE SHOOTING AIDS (CONT.)

PROPERTY OF
L. F. BLANKENSHIP
3021 [illegible]
DENVER, COLO.

AUDIO

WEAK OR NO SOUND:

Substitute V13, V14, V15 and V16.
Check audio amplifier and output stages by momentarily shorting pin 1 of V15 to ground. A loud noise should be heard as a result.
Check setting of ratio detector and adjustment of A7.

BUZZ:

Adjust ratio detector secondary for minimum buzz. If still objectional substitute V14 and readjust ratio detector.

DISTORTED:

Check audio amplifier and output stages using audio signal generator. If no distortion is present, check adjustment of ratio detector, A9, and sound IF adjustment, A7 and A8.

POWER

SMALL RASTER:

Substitute V26.
Measure B+.

If Low	If Satisfactory
Check B+ filter network for open or leaky filter capacitors. Check for shorts.	Proceed as outlined under INSUFFICIENT SWEEP, HORIZONTAL.

DIM PICTURE:

Substitute V26.
Measure B+.

If Low	If Satisfactory
Check filter network for shorts, leaky and open filter capacitor.	Check picture tube. Proceed as outlined under WEAK HIGH VOLTAGE.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE:

Substitute V21, V22, V23, V24 and V25.
Check T3 and other components of the horizontal output stage.

WEAK HIGH VOLTAGE:

Substitute V21, V22, V23, V24 and V25.
Check waveform at W17.

If Satisfactory	If Unsatisfactory
Proceed as outlined under LOSS OF HIGH VOLTAGE.	Check horizontal oscillator circuit especially the coupling network to output stage.

BLOOMING:

Substitute V25.
Check R127 for change of value.
Check picture tube.

GENERAL

RASTER, NO SOUND, NO PICTURE:

Substitute V4, V5, V6 and V8.

RASTER, SNOWY PICTURE, GOOD SOUND: (HIGH SIGNAL AREAS)

Substitute V3.

RASTER, GOOD SOUND, WEAK PICTURE: (HIGH SIGNAL AREAS)

Substitute V7.

RASTER, GOOD SOUND, NO PICTURE: (HIGH SIGNAL AREAS)

Substitute V9.

INTERMITTANT STREAKS:

Check high voltage section for corona discharge and arcing.

UHF TUNER

If UHF tuner is not functioning properly first substitute V1 and V2. To determine if oscillator is working, measure oscillator grid currents. This may be done by connecting a microammeter across the 22Ω resistor, R13. A 10 to 30 micro amp reading should be obtained. Some models have a jumper in place of R13. In these models remove jumper and insert a milliammeter, (10 mill scale). A 1 to 3 milliamp reading should be obtained.

To check both oscillator and crystal detector, oscillator injection current is measured. This may be done by placing a microammeter across the 22Ω resistor R9. Using the 100 micro amp scale, a reading of 5 to 40 micro amps should be obtained if both oscillator and mixer are functioning normally.

If it becomes necessary to replace the crystal diode, M9, it will be necessary to remove the picture tube and the crystal cover. In resoldering crystal, each lead should be held with long nose pliers to dissapate heat so as not to damage crystal.

If dial cord replacement becomes necessary refer to Raytheon part number for exact replacement.
A special cord is used that is not affected by heat or moisture. Exact length is required for tracking purposes.

CAUTION! When servicing UHF tuner do not rearrange or move any components on mechanical parts as their placement is critical and may seriously affect operation of this unit.

CAUTION! Do not attempt adjustment of the tracking screws, oscillator trimmer screws or oscillator cavity. Precision test equipment is required for these adjustments.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiving equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of RF Tuner Oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

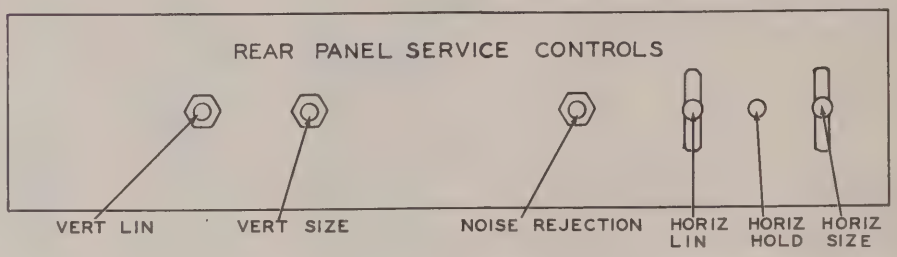
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding metal strip at bottom of safety glass. Remove metal strip and remove safety glass by pulling out and down. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - NOISE REJECTION CONTROL

The noise rejection control should be adjusted to the position which results in the most stable synchronization.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set horizontal hold thumb screw 2 turns from fully clockwise. Adjust horizontal hold slug to synchronize picture.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector buzz, adjust the Ratio Detector Secondary (L44) accessible from either top or bottom,using proper hex alignment tool. (See tube placement chart).

FUSES

One fuse is used for LV Power Supply protection. (See tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of picture tube located flush against the yoke.

Turn the disk like knob and at the same time rotate the ring around the tube until picture is properly centered.

BUILT-IN ANTENNA TUNING

Built-in antenna can be adjusted from rear of the cabinet. Adjust for a picture of maximum contrast and minimum ghosts.

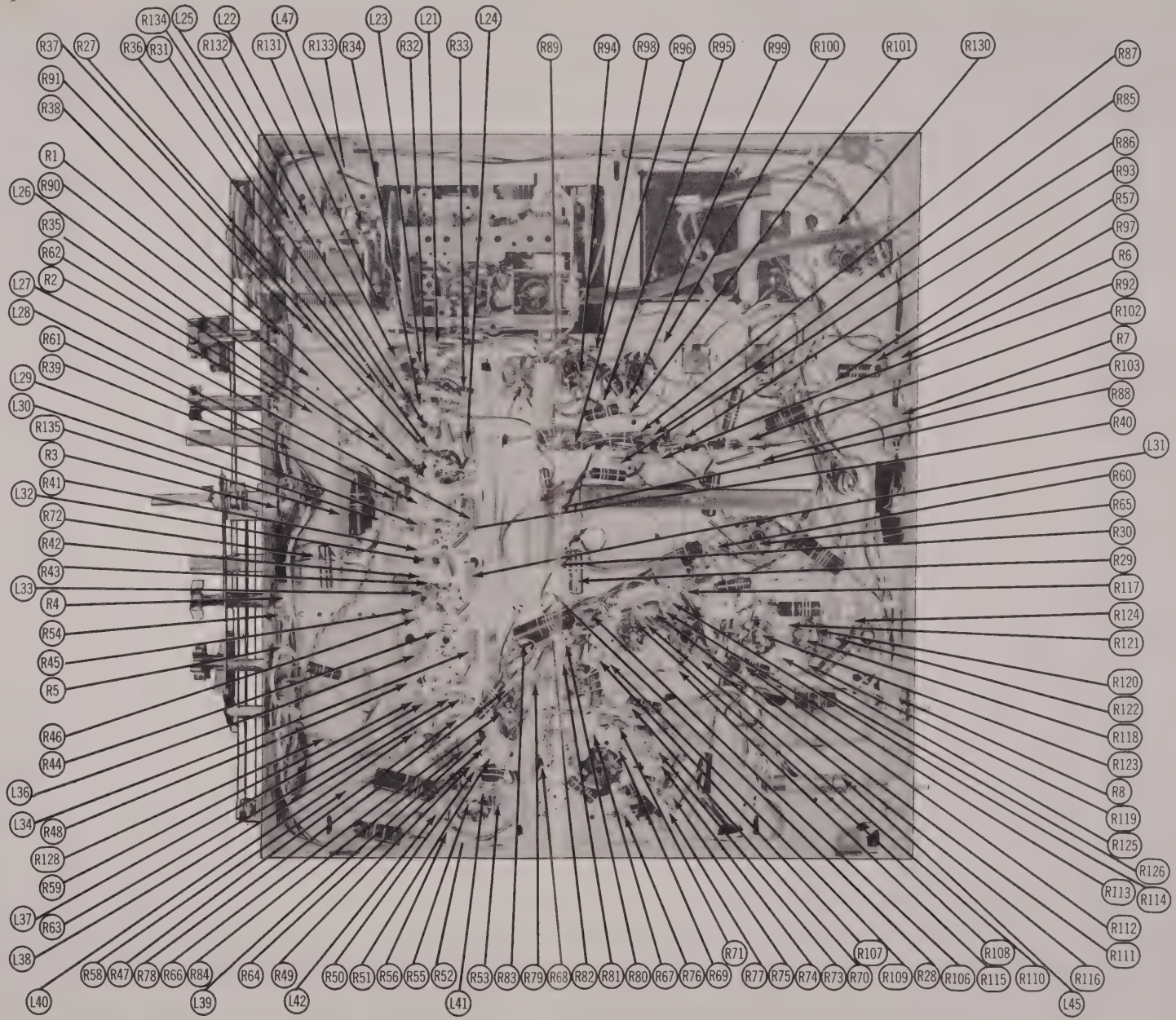
ANTI-PIN CUSHION CORRECTION

Adjust the picture centering until an edge of the raster is visible. Loosen the positioning screws and slide the magnet backward or forward until the raster edge is straight andvertical.

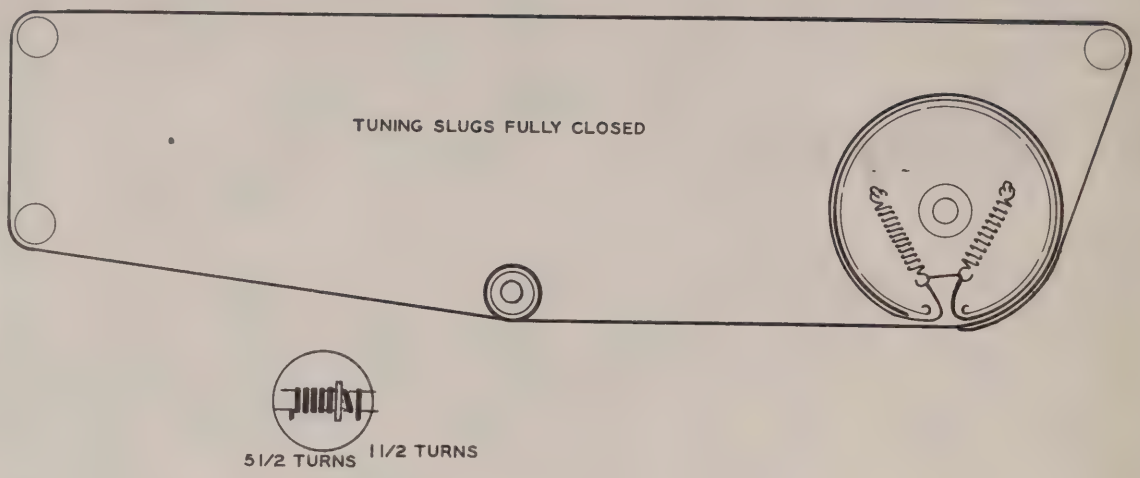
Any tendency to key stoning should be corrected by moving the magnet up or down in a vertical plane.

DISASSEMBLY INSTRUCTIONS

1. Remove 2 push on type control knobs and 1 switch lever from front panel.
2. Disconnect VHF built-in antenna. Remove 2 wood screws. Remove UHF antenna bracket.
3. Remove 4 wood screws and 1 bolt. Remove rear cover.
4. Disconnect speaker and AM loop antenna.
5. Remove 5 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



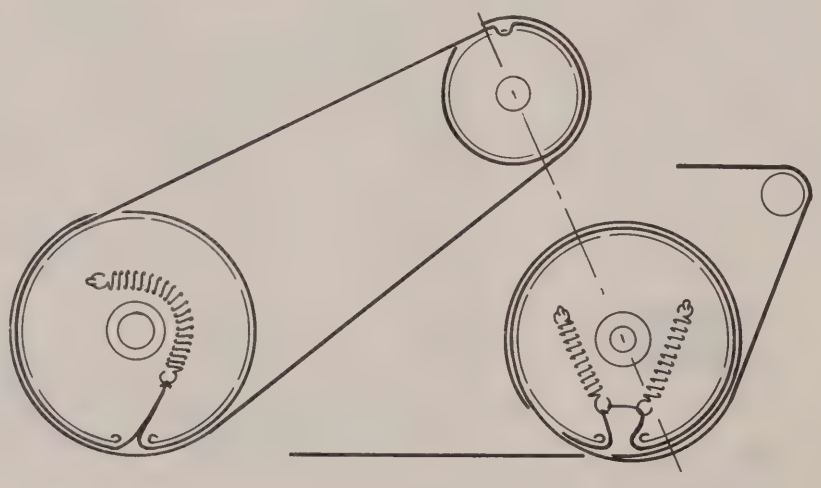
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



DIAL CORD DRIVE

TV TUNING DRIVE CORD STRINGING

TUNING GANG FULLY OPEN



AM TUNER CORD DRIVE

RADIO DRIVE CORD STRINGING

PHONE: Mt. Carmel 1200

THORDARSON-MEISSNER

SEVENTH AND BELLMONT
MT. CARMEL, ILLINOIS

THORDARSON "FLY-37"

HORIZONTAL OUTPUT AND HIGH VOLTAGE TRANSFORMER

EXACT REPLACEMENT FOR

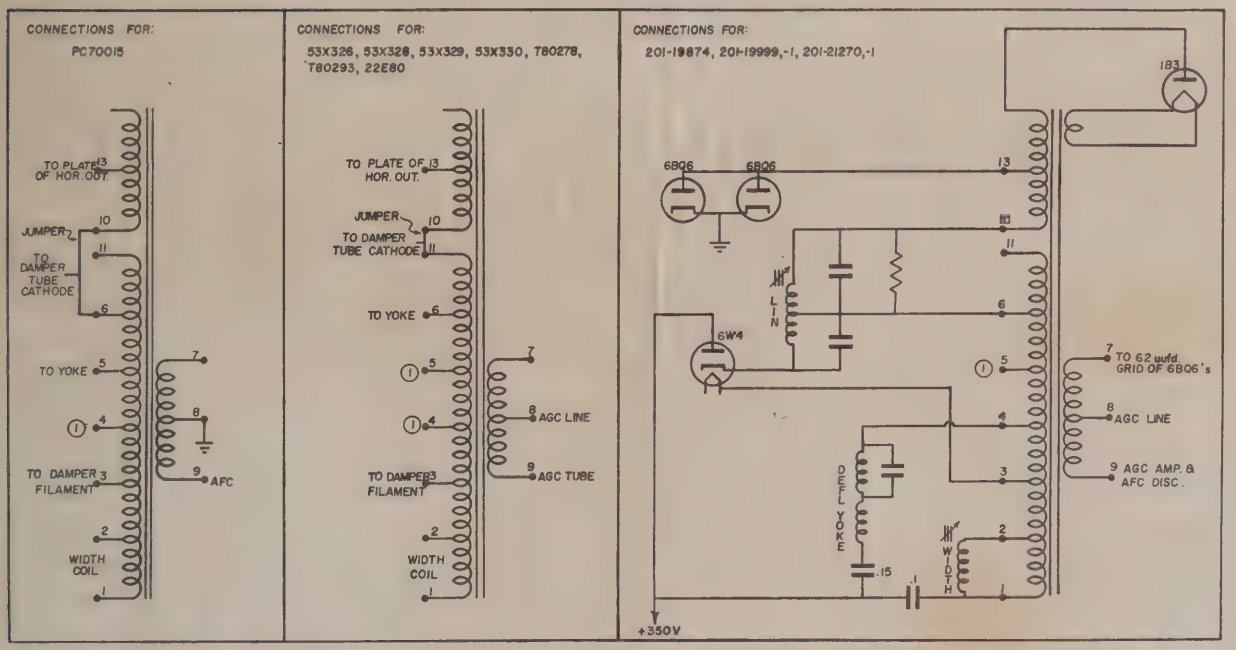
AIRLINE, RAYTHEON AND TRUETONE
201-19874, 201-19999, 201-21270, -1

AIRLINE, CORONADO, FIRESTONE, TRUETONE, AND WELLS GARDNER
53X326, 53X328, 53X329, 53X330

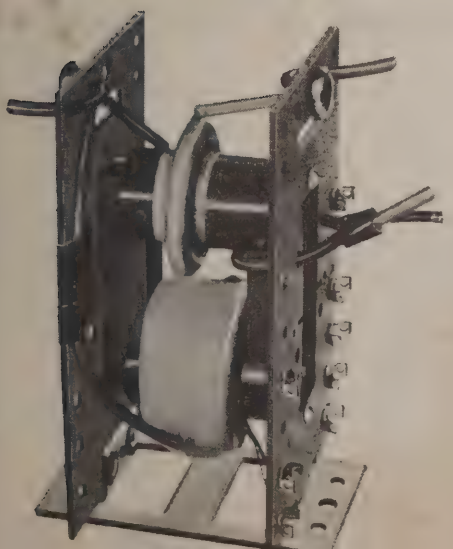
SILVERTONE AND WARWICK
T80-278, T80-293

SENTINEL 22E80

SPARTON PC70015



NOTE:
① ALTERNATE YOKE CONNECTIONS FOR CHANGING PICTURE WIDTH



WIRING CHART

FLY-37	201-1999, -1	201-21270, -1	201-19874	53X326 53X328 53X329 53X330 T80-278 T80-293	22E80	PC70015
	CORRESPONDING PIN NOS.					
7	7	7	7	NC	NC	NC
8	8	8	8	G	2	3
9	9	9	9	A	3	4
1	1	1	1	1	5	5
2	2	2	2	2	4	NC
3	3	3	3	NC	9	9
4	4	4	NC	3	NC	NC
5	5	NC	4	NC	NC	10
6	6	5	5,6	4	10	
11	NC	NC	NC	JUMPER	JUMPER	NC JUMPER 6 to 10
10	10	6	10			

NO LOAD VOLTAGE - 18 KV
MAXIMUM SCAN - 70°

THORDARSON MATCHED COMPONENTS:
Flyback - FLY-37
Yoke - Y-5
Width Coil - WC-11
Linearity Coil - WC-16

FLY-37 MAY BE USED IN THE FOLLOWING MODEL AND CHASSIS NUMBERS

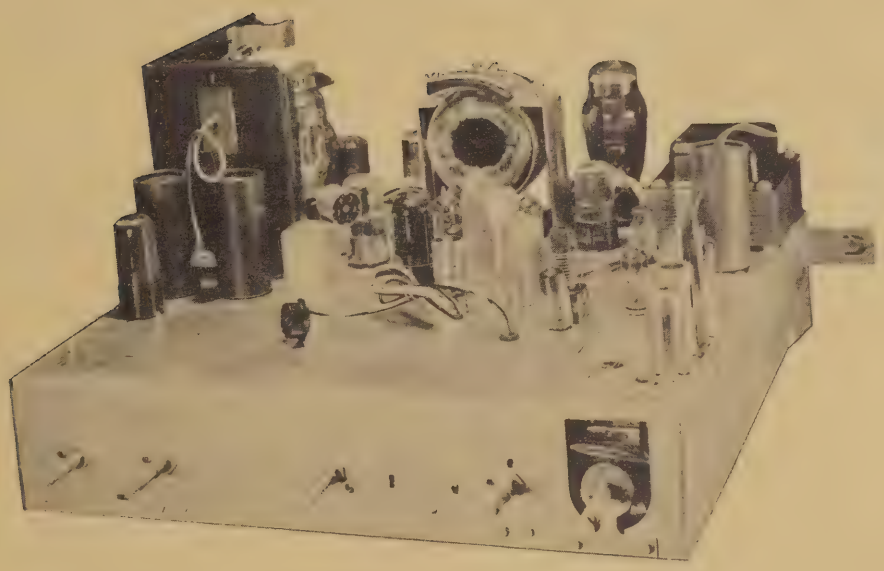
C 2113 A
Raytheon

SET MANUFACTURER	PART NUMBER	MODEL OR CHASSIS
Airline (Montgomery Ward)	201-19874, 201-19999-1	15BR-3054A
	53X326,	(25) WG-3060A, B, -3066C, -3070A, B, -3071C, D, 3072C, -3073C, D, -3075A, B, D, E, -3077A, B, D, E, -3079A, B, D, E: 35WG-3175A, -3177A, -3179A, -3080A, 3090A; WG-3180A, 3190A
Coronado	53X326, 53X328, 53X329, 53X330	25TV2-43-9022A, B, C, -9045A, B, C, D, E, F, -9060A, B, C, D, E, F, -9060A, B, D, C, E: 35TV2-43-9022C, -9023A, -9045D, E, F, -9050A, -9061A, -9060C, ED: 45TV2-43-9023B, 9061B, -9064A
Firestone	53X326 53X330	13G110, 115, 116, 119, 120
Raytheon	201-19874	20AY21, 21AY21, 21T3:C-2001A, -C-2002A, RC-2005A, C-2006A, C-2103A, C-2105A, M-2101A, C-2112A, C-2113A, C-2114A, C-2115A, C-2116A, C-2118A, RC-2117A
Sentinel	22E80	581, 582, 584, 585
Silvertone (Sears Roebuck	T80-278 T80-293	528.239, .247, -2, .249, -1, .256, -3, .264, -1, -2, .266, -1, .270, -1, .286, .290, -1, -2, .291, -1, -2, .292, -1, -2, .297, .298-1, -2, .300, -2, 302, .303: 2170F, 3109, 3110B. 3112A, E, 3030L, 3151A, B, C, 3170C, D, 3171A, 4107A, B, 4108A, 4110, 4111A, 4112, 4113, A, B, 4114, B, 4115, 4116, 4117, 4118, B, C, 4119A, 4124, 4125, 4126, A, B, D, 4127, C, D, 4128A, 4129A, B, 4132, 4133, 4135, 4139, A, 4140, D, E, 4143D, 4145D, 4149, 4150, D, E, 4153, D, 4155, D, E
Sparton	PC70015	21S73A, 21S212, 21S213, A, 21S214, 24U213, 24U174, 24U214, 25D173A, 25S172: 5225A, 5226A, 5240, 5241, 5270, 5280, 5281, 5301, 5325, 5326, 5340, 5341, 5362, 5363, 5380, 5381, 11322, 11324, 15312, 15314, 20312, 20313, 21322, 21324, 30112, 30114, 31322, 32324, 35322, 34324, 35342, 35348, 36342, 36343, 50312, 50314, 58112, 58114.
Truetone (Western Auto)	201-19874 201-19999, -1	20AY21, 20AY22, 21AY21A: 2D1191A, 2D1224A, 2D1225A 2D1228A, 2D2215A, 2D2223A
	53X326, 53X328 53X329	2D1230B, C, D, E, 2D1235A, B, C, D, E, 2D1330, 2D1331A, B, C, 2D1336A, 2D1344A, 2D1345A, 2D1430A, 2D2333A, B, C, D, 2D2334A, 2D2431A, 2D2433A
Wells Gardner	53X326 53X328, 53X329, 53X330	321MS31C-222, -224, -272, -274, -276, -280, -282, -284, -296: 321MS39-322, 372-2, 376-1; 321MS31-35A6-386-1, 2321MS31-35A6-388-1; 2321MS39-324, -370, -396-1.

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



SHAW CHASSIS 224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2)

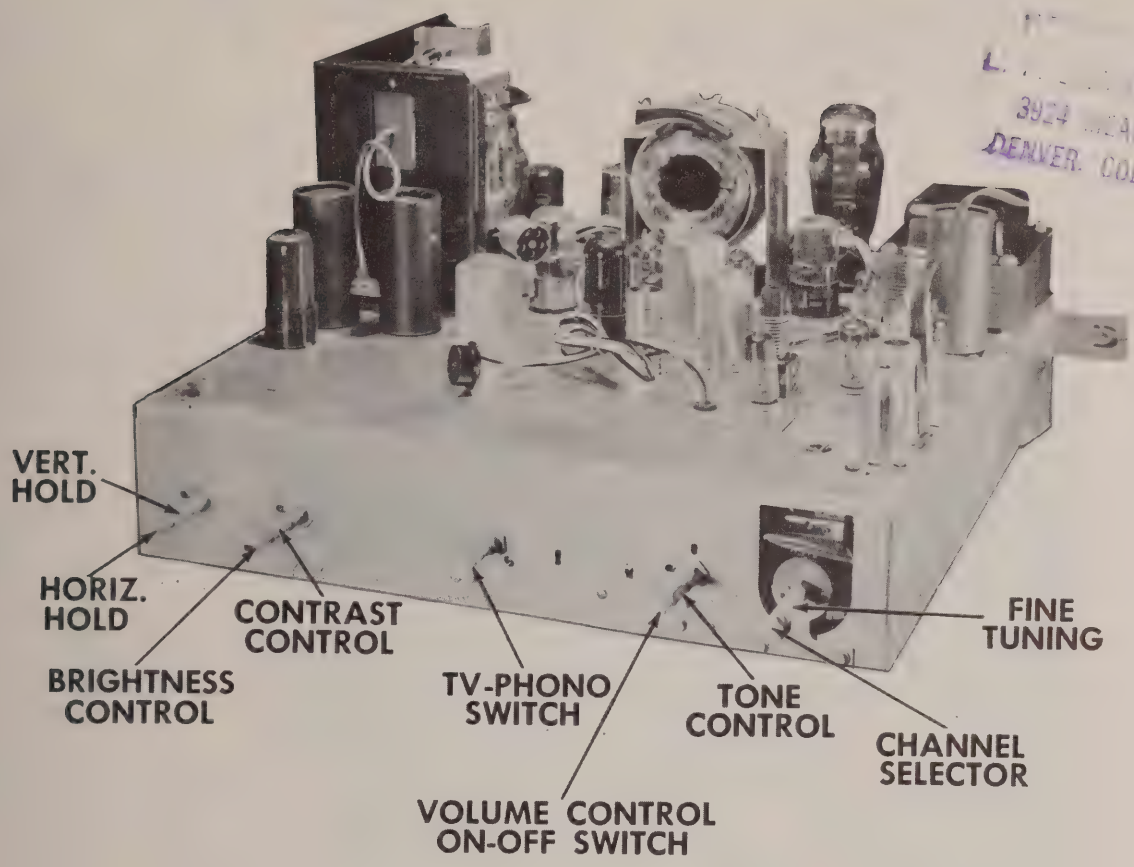
CHASSIS 224

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

SHAW CHASSIS 224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2)

L. [illegible] TELEVISION
3924 [illegible] ST.
DENVER, COLORADO



SHAW CHASSIS 224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2)

TRADE NAME	Shaw Model 121, 421, 921, 1521, 2021, 2221, 2321, 2521, 2621, 3021, 3321, 3421, 3521, 4021, 4221, 4321, 4421 (Ch. 224) (Runs 301, 302, 303, 304, -1, -2, 305, -2.)
MANUFACTURER	Shaw Television Corp., 195 Front St., Brooklyn 1, N.Y.
TYPE SET	Television Receiver
TUBES	Twenty-Three

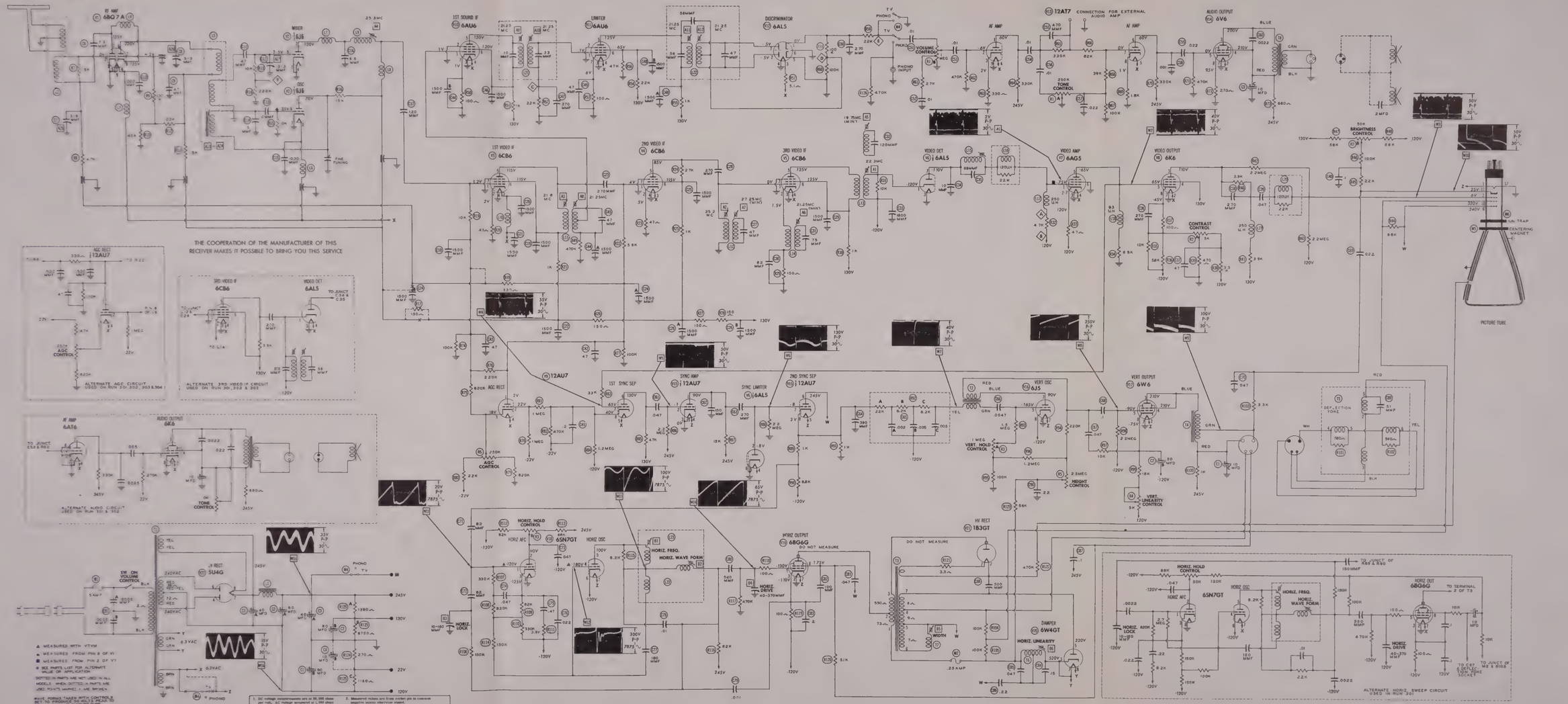
POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 2.08 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Seperate Sound)

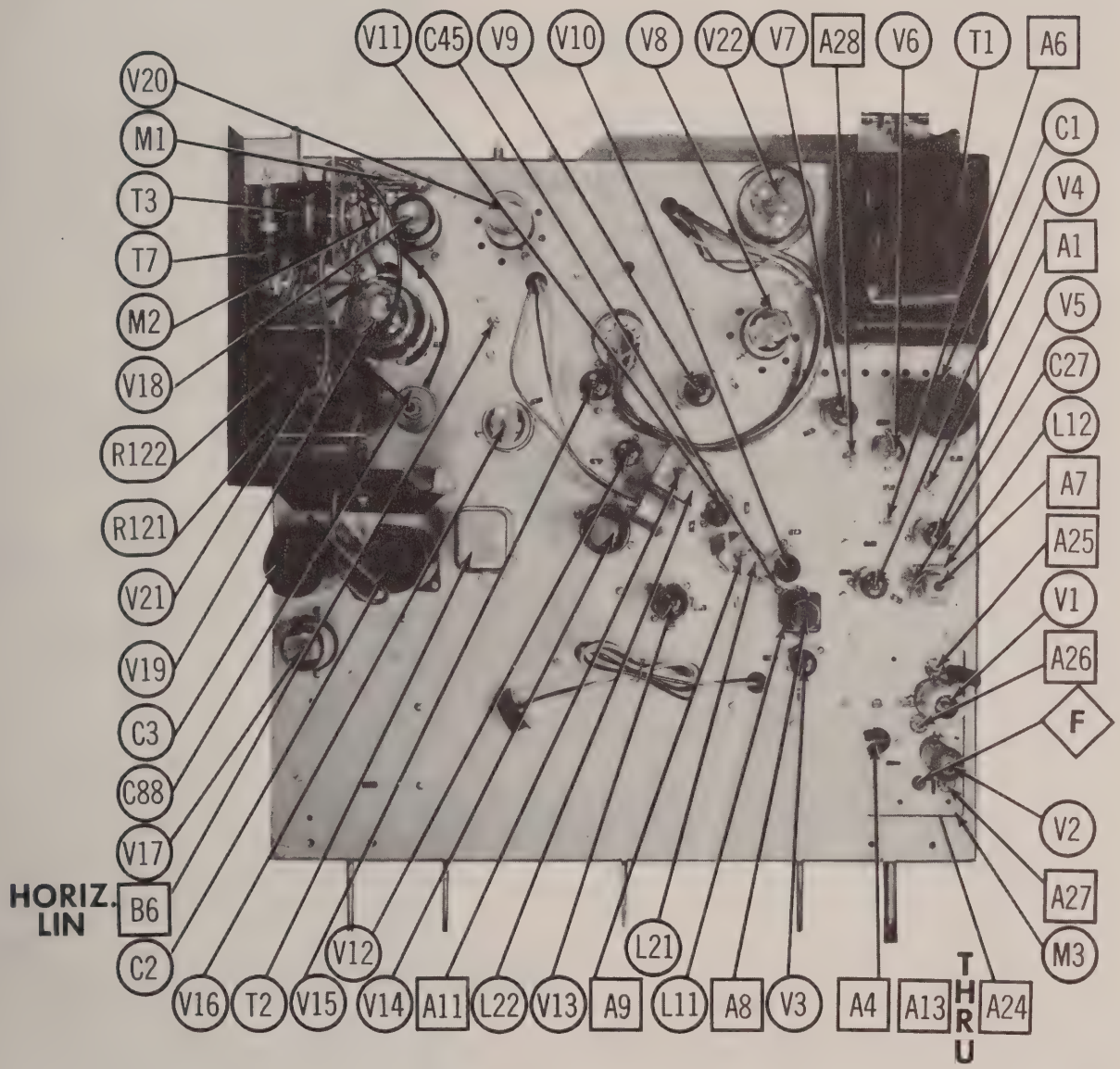
INDEX

Alignment Instructions 6,7
Horizontal Sweep Circuit Adjustments 13
Parts List and Descriptions 14, 15, 16
Photographs
Chassis-Rear View 13
Capacitor and Alignment Identification 4, 9
Chassis -Top View 3
RF Tuner 10
Photographs (Cont)
Resistor and Inductor Identification 11, 18
Resistance Measurements 8
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

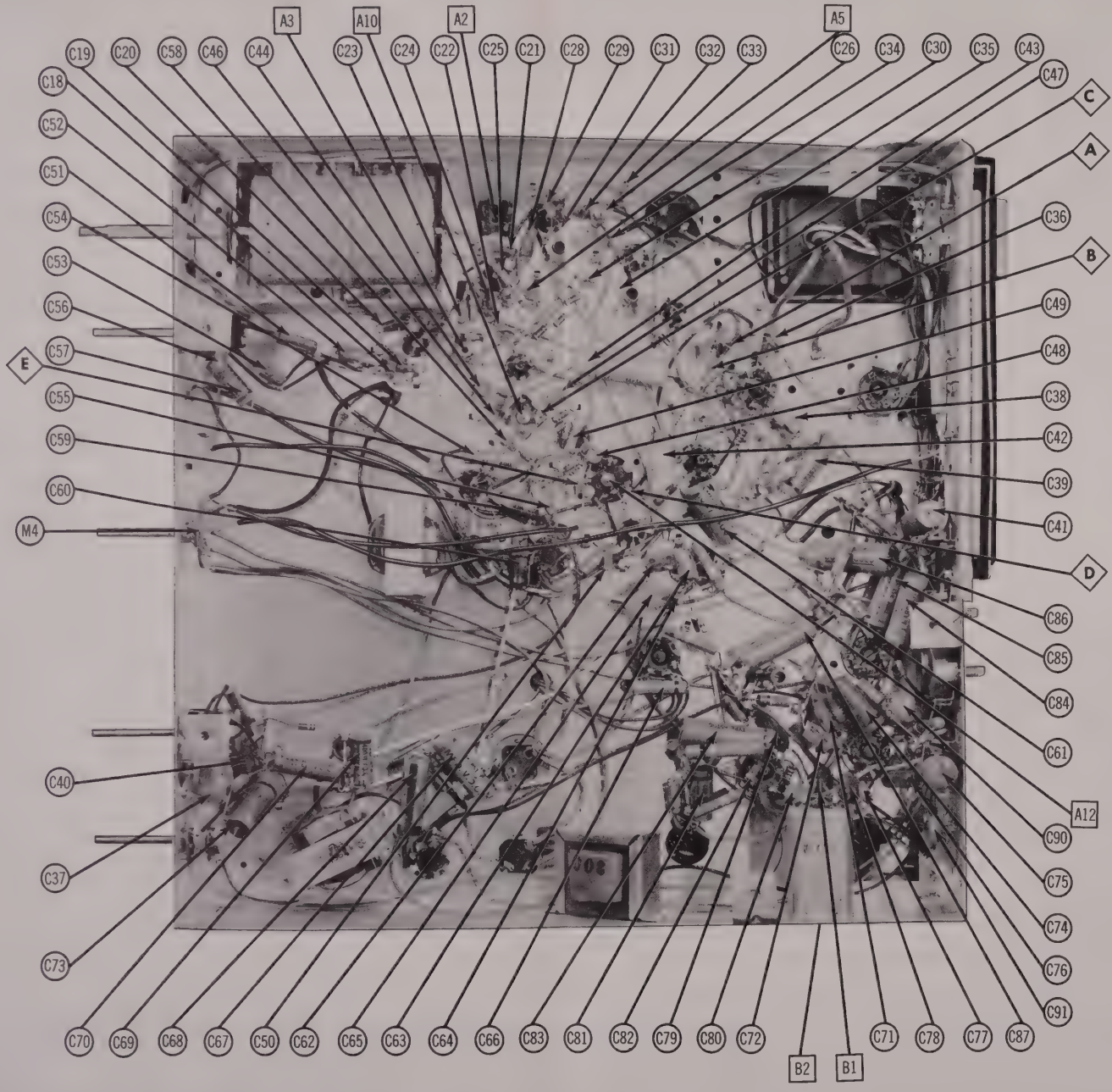
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1953
SHAW CHASSIS 224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2)



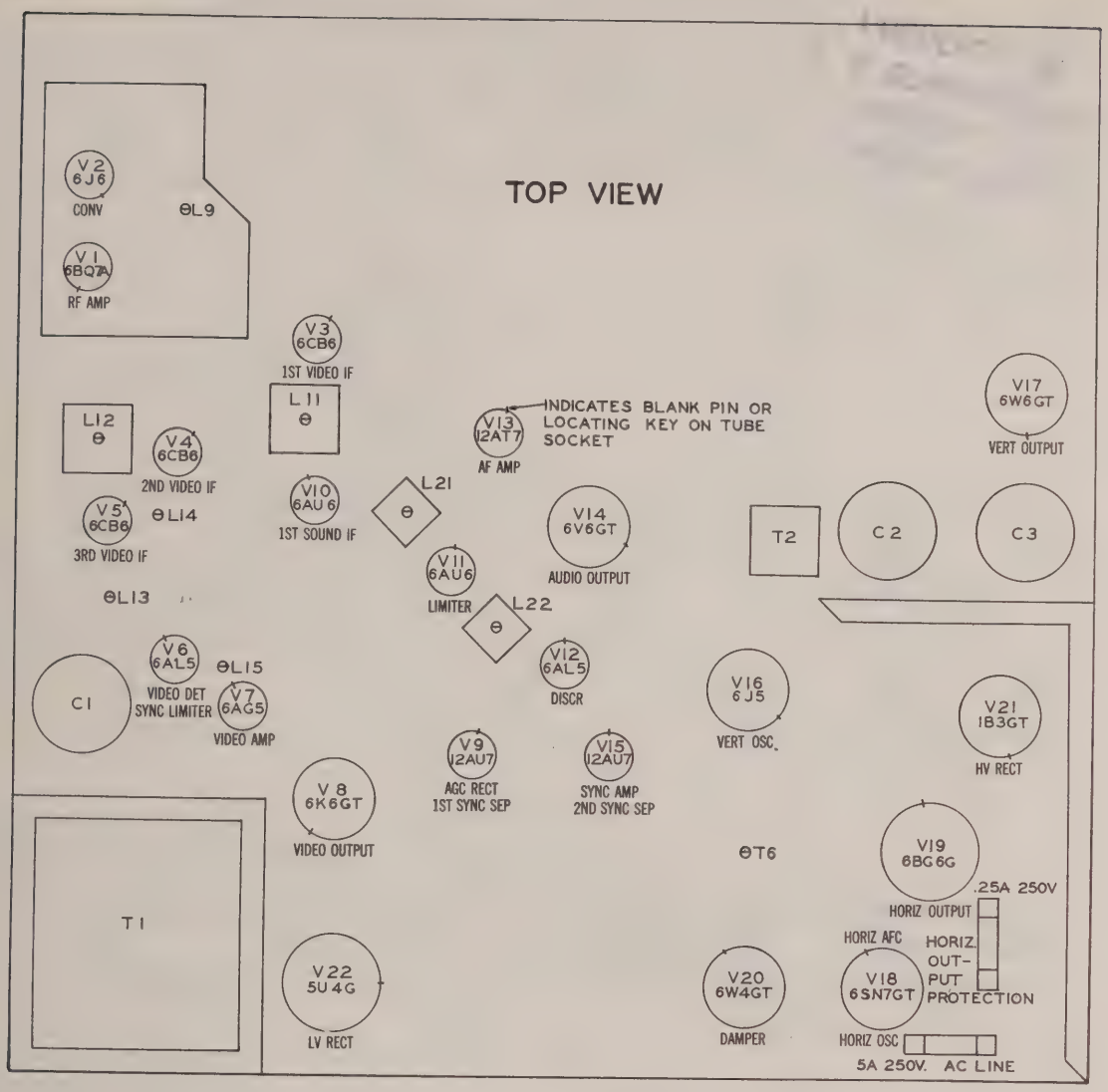
CHASSIS TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V22 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V4, V5, V6, V7, V8, V23
Has pic, no sound-V10, V11, V12, V13, V14
Overloaded picture-V9

SYNC FAILURE
No vert. sync-V15, V16
No horiz. sync-V15, V18
No vert. or horiz. sync-V6, V9, V15

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V23 Fuse (M2)
No vertical deflection-V16, V17
Poor vert. linearity or foldover-V16, V17
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22
Vert. off freq. -V15, V16
Horiz. off freq. -V15, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube (V18).

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed.
This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C42. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	22.3MC (Unmod)	Any	DC probe to point (A) Common to point (B)	A1	Adjust for maximum deflection.
2.	"	"	25.2MC	"	"	A2	"
3.	"	"	21.8MC	"	"	A3	"
4.	"	"	25.3MC	"	"	A4	"
5.	"	"	19.75MC	"	"	A5	Adjust for MINIMUM deflection.
6.	"	"	21.25MC	"	"	A6, A8	"
7.	"	"	27.25MC	"	"	A7	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.25MC 22.25MC 25.75MC	Any	Vert. amp to point (A) Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	21.25MC (Unmod)	Any	DC probe to point (C) Common to chassis.	A9, A10	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (D) Common to chassis.	A11	"
11.	"	"	"	"	DC probe to point (E) Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizonal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	21.25MC (450KC Swp)	21.25MC	Any	Vert. amp to point (C) Low side to chassis.	A9, A10	Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
10.	"	"	"	"	"	Vert. amp to point (E) Low side to chassis.	A11, A12	Adjust A11 for maximum amplitude and straightness of crossover lines as in Fig. 3. Adjust A12 so that 21.25MC occurs at center of crossover lines. SLIGHTLY retouch A11 as above. Continue alignment with step 12.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	215.75MC	13	DC probe to point (E) Common to chassis.	A13	Adjust for a zero reading. A positive and negative reading will be obtained on either side of the correct setting.
			209.75MC	12		A14	
			203.75MC	11		A15	
			197.75MC	10		A16	
			191.75MC	9		A17	
			185.75MC	8		A18	
			179.75MC	7		A19	
			87.75MC	6		A20	
			81.75MC	5		A21	
			71.75MC	4		A22	
			65.75MC	3		A23	
			59.75MC	2		A24	

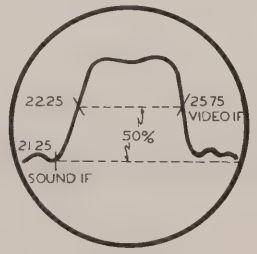


FIG. 1

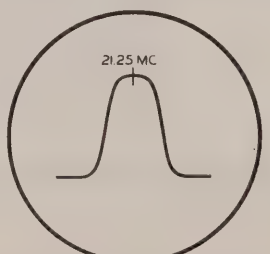


FIG. 2

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect bias battery as under Video IF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. amp thru 10KΩ to point ◇F◇ Low side to chassis.	A25,A26, A27	Adjust for response curve similar to Fig. 4.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel make slight compromise adjustments of A25, A26 and A27 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10 MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	181.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

4.5MC TRAP ALIGNMENT

Turn set on and tune in a TV test pattern.
Adjust A28 for maximum vertical wedge definition.

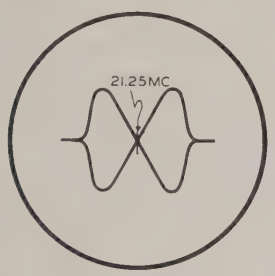


FIG. 3

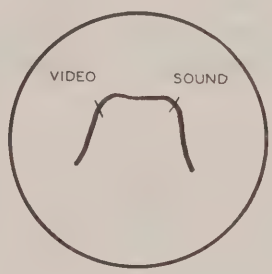
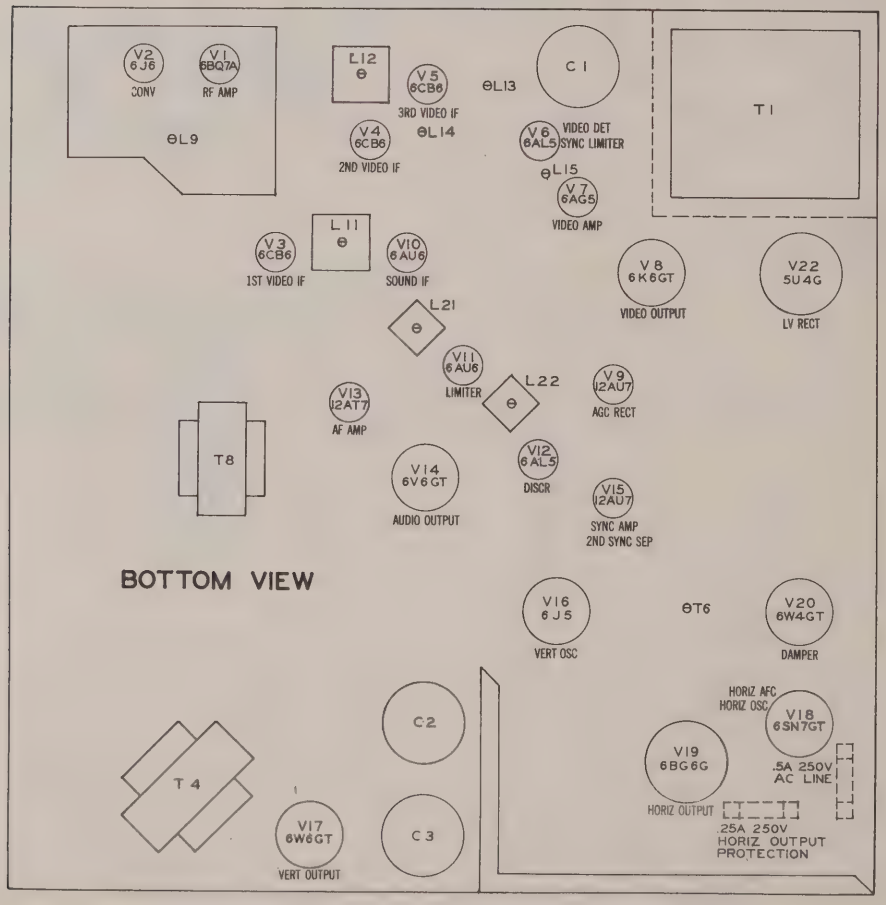


FIG.4

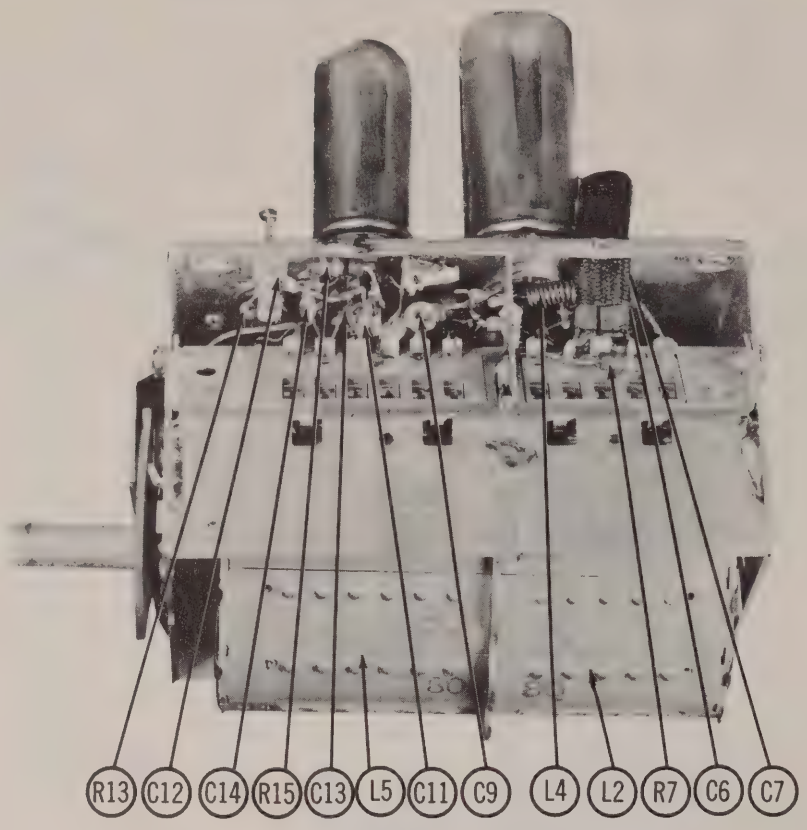
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	147KΩ	0Ω	.1Ω	0Ω	†2.4KΩ	†200KΩ	INF	0Ω
V 2	6J6	†16KΩ	†2KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	80KΩ	47Ω	.1Ω	0Ω	†2.9KΩ	†2.9KΩ	0Ω		
V 4	6CB6	80KΩ	47Ω	0Ω	.1Ω	†5.5KΩ	†2.7KΩ	0Ω		
V 5	6CB6	0Ω	150Ω	0Ω	.1Ω	†2.4KΩ	†2.4KΩ	0Ω		
V 6	6AL5	800Ω	2.3Meg	.1Ω	0Ω	0Ω	0Ω	5.5KΩ		
V 7	6AG5	5.5KΩ	850Ω	0Ω	.1Ω	6.8KΩ	0Ω	850Ω		
V 8	6K6GT	0Ω	0Ω	†9.5KΩ	†1.4KΩ	6.8KΩ	6.8KΩ	.1Ω	1.2KΩ	
V 9	12AU7	75KΩ	600KΩ	60KΩ	0Ω	0Ω	†50KΩ	40KΩ	1.2Meg	.1Ω
V 10	6AU6	470KΩ	0Ω	0Ω	.1Ω	†2.4KΩ	†2.4KΩ	100Ω		
V 11	6AU6	22KΩ	0Ω	0Ω	.1Ω	†2.4KΩ	†17KΩ	100Ω		
V 12	6AL5	200KΩ	100KΩ	.1Ω	0Ω	0Ω	0Ω	100KΩ		
V 13	12AT7	†330KΩ	470KΩ	330Ω	0Ω	0Ω	†330KΩ	70KΩ	1.8KΩ	.1Ω
V 14	6V6GT	0Ω	.1Ω	†900Ω	†680Ω	470KΩ	185KΩ	0Ω	270Ω	
V 15	12AU7	†15KΩ	†2.2Meg	0Ω	.1Ω	.1Ω	†38.5Ω	2.2Meg	900Ω	0Ω
V 16	6J5	0Ω	0Ω	900KΩ	40KΩ	2.3Meg	40KΩ	.1Ω	800Ω	
V 17	6W6GT	0Ω	0Ω	†2.2KΩ	†2.2KΩ	2.2Meg	3KΩ	.1Ω	5KΩ	
V 18	6SN7GT	1.5Meg	†50KΩ	412KΩ	480KΩ	†82KΩ	800Ω	.1Ω	0Ω	
V 19	6BG6G	0Ω	0Ω	900Ω	800Ω	470KΩ	490KΩ	.1Ω	†5.1KΩ	Top Cap ‡81Ω
V 20	6W4GT	INF	130KΩ	140KΩ	INF	†54Ω	INF	‡0Ω	‡.1Ω	
V 21	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ‡630Ω
V 22	5U4G	INF	6KΩ	INF	820Ω	INF	820Ω	INF	6KΩ	
V 23	Pix Tube	0Ω	2.2Meg	Pin 6 †38.5Ω	Pin 10 ♦40KΩ	Pin 11 160KΩ	Pin 12 .1Ω			

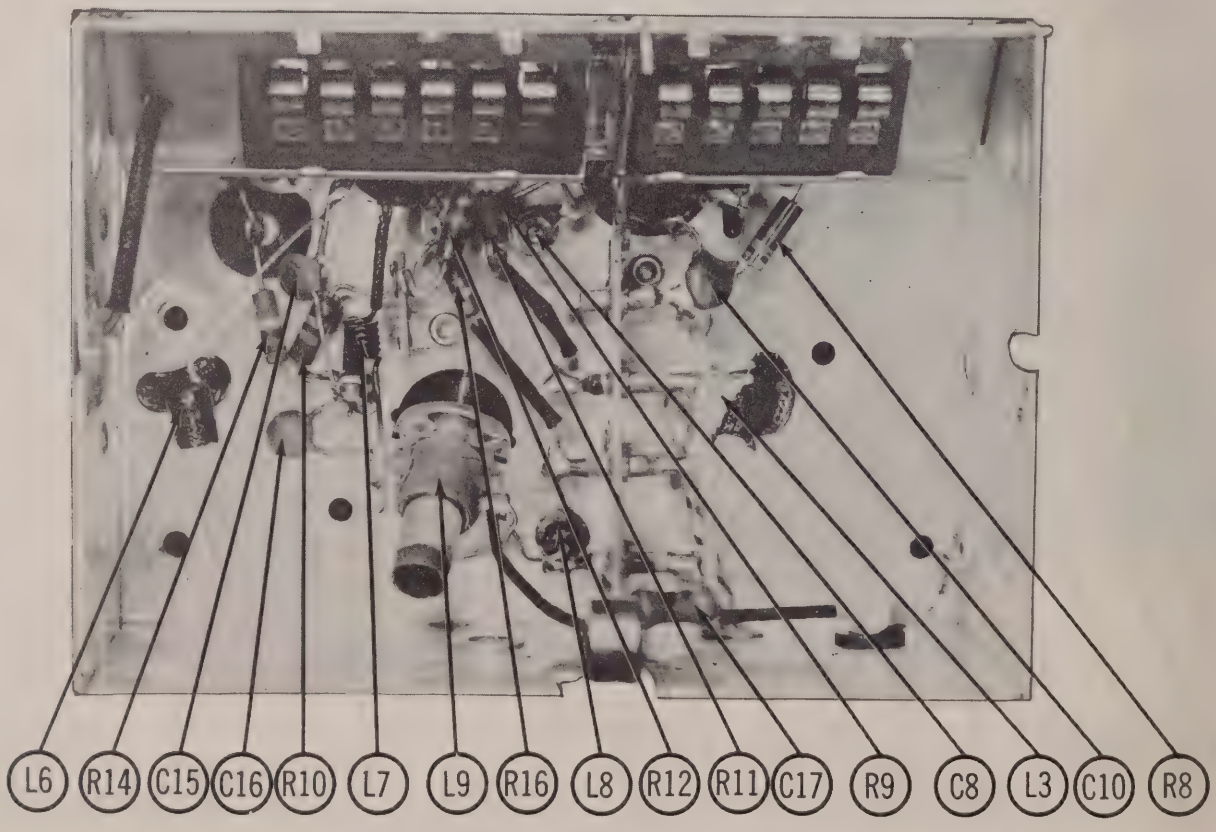
† MEASURED FROM PIN 2 OF V22.
♦ MEASURED FROM PIN 5 OF V20.
‡ MEASURED FROM PIN 3 OF V20.



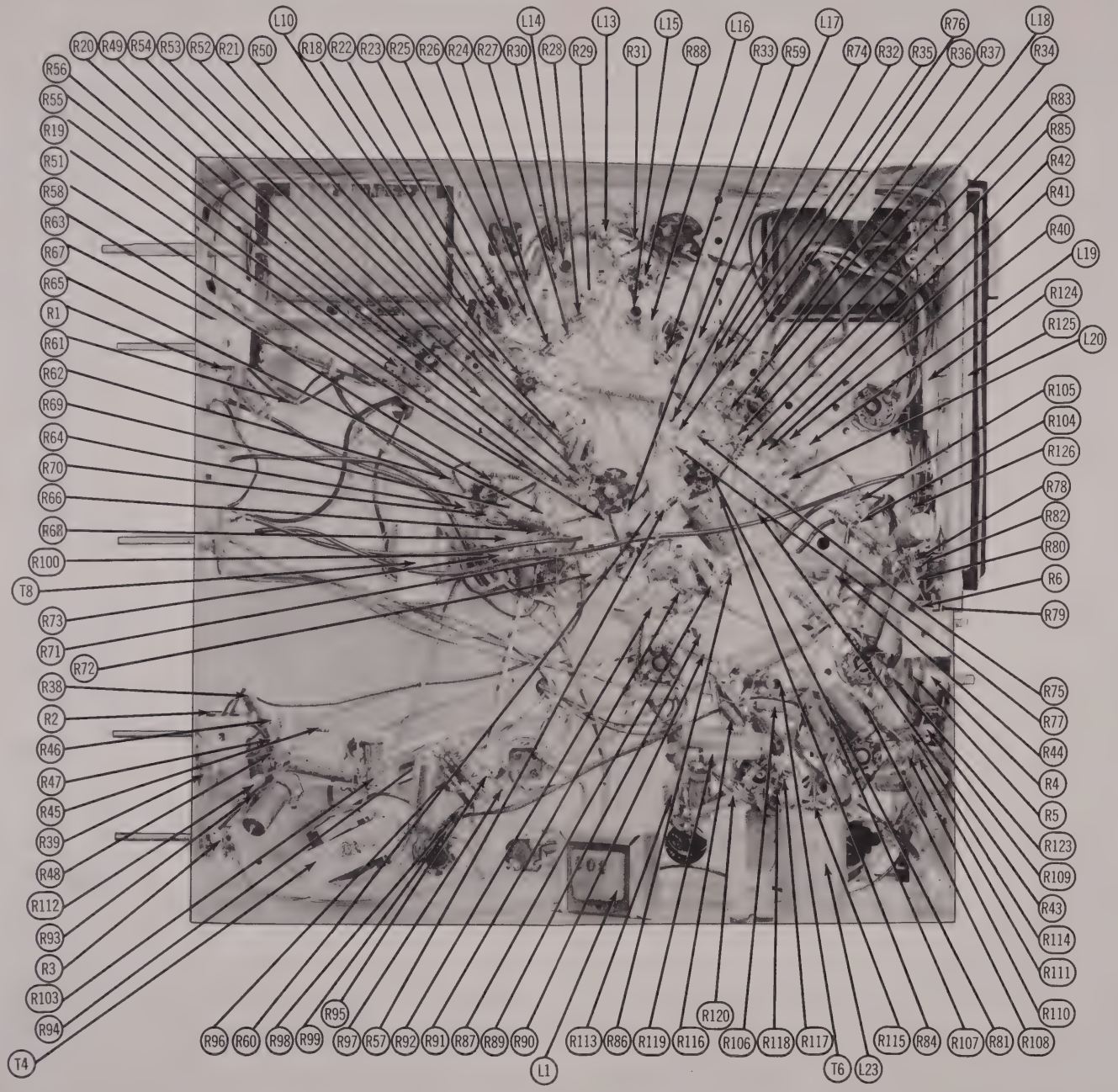
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check horizontal winding of deflection yoke for open. Check C87 for open.

INSUFFICIENT SWEEP

Substitute V18, V19 and V20.
Check waveform at W14.

If Satisfactory	If Unsatisfactory
Check T3, C81, C82, C84, C85 and C86. Check other components of the horizontal output stage.	Check setting of horizontal drive, B4, C79 and C8. Check other components of the coupling network between V18 and V19.

DRIVE LINES

Check adjustment of horizontal drive, B4.
Substitute V18, V19 and V20.

COMPRESSED AT LEFT SIDE

Substitute V18, V19 and V20. Check T3 and associated components.

FOLDS

Substitute V19 and V20. Check T3 and other components associated with V20.

XMAS TREE EFFECT

Substitute V18. Check setting of B1 and B2.
Check L23.

VERTICAL

LOSS OF SWEEP

Substitute V16 and V17.
Check waveform at W8.

If Satisfactory	If Unsatisfactory
Check T4, yoke and other components of the vertical output stage.	Check T2, C68 and other components of the vertical oscillator stage.

INSUFFICIENT SWEEP

Substitute V16 and V17.
Check C1C and C2B. Check T4.

COMPRESSED AT BOTTOM

Substitute V17. Check C2B. Check T4.

FOLDS:

Substitute V16 and V17. Check C1C and T4.

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V6, V19, V15 and V18. Check C71 and C72.
Check other components associated with V18.

CRITICAL SYNC

Substitute V6, V9, V15 and V18. Check C71, C72 C73 C77 and C78. Check L23.

PULLING PICTURE

Substitute V18. Check C74, C75 and C76.

VERTICAL

LOSS OF SYNC

Substitute V6, V9 V15 and V16. Check the integrator network. Check T2. Check C66.

CRITICAL SYNC

Substitute V6, V15 and V16. Check the integrator network. Check C66.

TRIGGERING

Substitute V16. Check filament lead dress near V6, V15 and V16.

VIDEO

SOUND BARS

Check setting of local oscillator. Check adjustmdnt of 4.5MC trap, A23.

POOR RESOLUTION

Substitute V3, V4, V5 and V6. Check video IF alignment.
Check components of video IF strip.

POOR CONTRAST

Substitute V6, V7 and V8. Check L16 and L20 for open. Check C31, C36, C37 and C38.
Check picture tube.

SMEAR

Substutute V6, V7 and V8.
Check L16 and L20 for open.
Check R40 and R41 for change of value.
Check C39.

ONE WIDE BLACK BAR ACROSS PICTURE

Check tuner, video IF, video detector and video amplifier stages for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

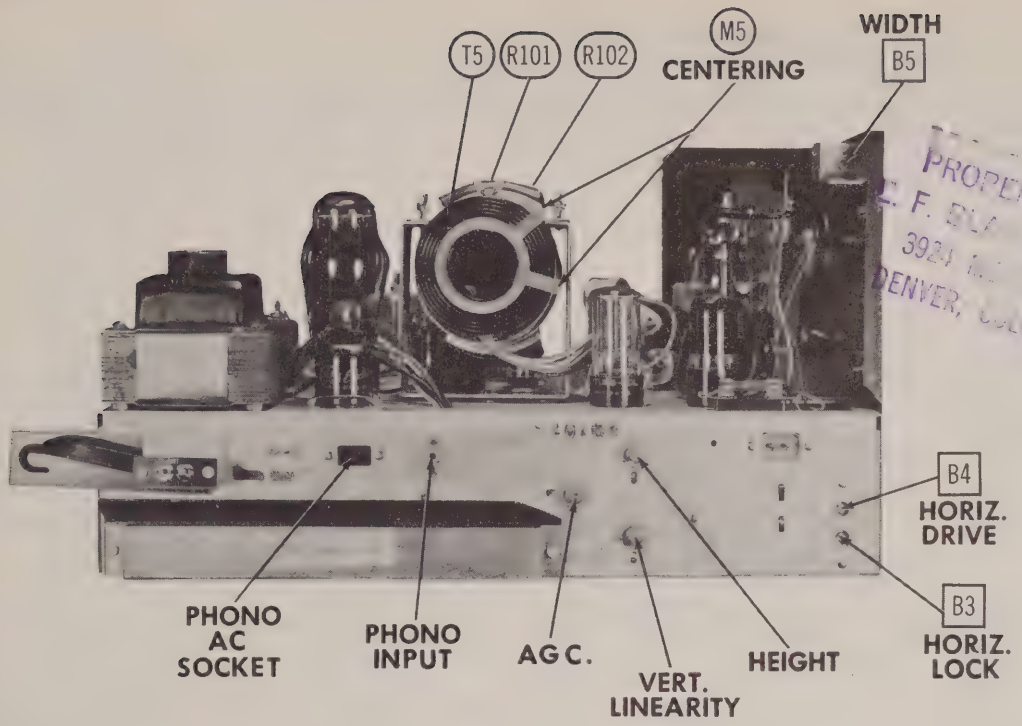
Substitute V3, V10, V11, V12, V13 and V14.
Check adjustment of ratio detector, A12.
Check alignment of audio IF strip A9, A10 and A11.
Check adjustment of sound take off trap, A8.

BUZZ

Check setting of ratio detector. If still objectionable, change V12 then readjust A12.

DISTORTED

Check audio amplifier and audio output stages V13 and V14 with audio signal generator. If no distortion is present, check adjustments of A8, A9, A10, A11 and A12.



CHASSIS-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If the picture cannot be made to synchronize with the horizontal hold control, set the control in the center of its range and adjust the horizontal frequency slug (B1) for synchronization.

If still unable to obtain satisfactory horizontal sync it may be necessary to adjust the waveform slug (B2).

Connect the low capacity probe of an oscilloscope to terminal C of L23 and view the waveform.

Turn the horizontal hold 1/4 turn from clockwise so that the picture is in sync. Adjust B2 until the broad and narrow peaks are of equal height as in Fig. 5. If necessary keep the picture in sync during adjustment by adjusting the horizontal hold.

HORIZONTAL LOCKING RANGE ADJUSTMENT

Set the horizontal hold control fully counter clockwise. Momentarily remove the signal by switching to another channel and back. If the picture is in sync turn B1 slightly and remove the signal as before.

Repeat until picture falls out of sync.

Slowly turn the horizontal hold clockwise and note the least number of diagonal bars just before the picture pulls into sync.

If more than 3 bars are present adjust the horizontal locking range trimmer (B3) clockwise.

If less than 2 bars are present, adjust B3 counter clockwise. Adjust B3 until 2 to 3 bars are present at the pull in point.

Adjust the horizontal drive trimmer (B4) counter clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B5) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B6) for a picture that is symmetrical from left to right.

AGC CONTROL ADJUSTMENT

Tune receiver to strongest TV signal available.

Set contrast and brightness controls for normal viewing. Adjust AGC control clockwise as far as possible without distortion or instability of picture.

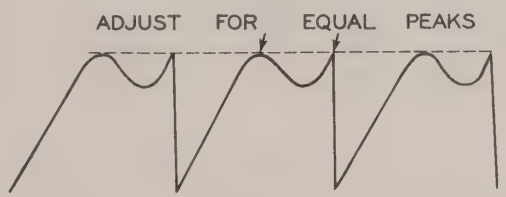


FIG. 5

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		SHAW PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector - Sync Limiter	6AL5	6AL5	6BT	
	Video Amplifier	6AG5	6AG5	7BD	
V8	Video Output	6K6GT	6K6GT	7S	
V9	AGC Rectifier - 1st Sync Separator	12AU7	12AU7	9A	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Discriminator	6AL5	6AL5	6BT	
V13	AF Amplifier	12AT7	12AT7	9A	
V14	Audio Output	6V6GT	6V6GT	7S	
V15	Sync Amplifier - 2nd. Sync Separator	12AU7	12AU7	9A	
V16	Vert. Oscillator	6J5	6J5	6Q	
V17	Vert. Output	6W6GT	6W6GT	7S	
V18	Horiz. AFC - Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BG6G	6BG6G	5BT	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SHAW PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450		AFH3-146		C105		FP370	TVL-3761	
B	▲80	150								
C	■10	450								
C2A	▲80	450		AFH2-91		BO72		FP244	TVL-2710	
B	▲50	50								
C3A	▲40	450		AFH3-146		C105		FP370	TVL-3761	
B	▲80	150								
C	■10	450								
C4	10									Note 1
C6	3.3									
C7	3-9				829-10					
C8	.5-3				829-3					
C9	47			BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C10	1000			BPD-001	DD-102	TM5D1	[illegible]	DC-521	5HK-D1	
C11	47			BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C12	.5-3				829-3			CT565A		
C13	10			SII0NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C14	5			SIN750			N750K-050	NT-555	5TCUB-V5	
C15	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C16	6.8			SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C17	120			SII20	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C18	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C19	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C20	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C21	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C22	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C23	270	500		1469-0003		5R5T3		MCB241	MS-33	
C24A	1500			BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C25	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C26A	1500			BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C27	47	500		1469-00005		5R5Q5		MCB225	MS-45	Note 2
C28	270	500		1469-0003		5R5T3		MCB241	MS-33	
C29	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C30	82			SII82	D6-820		GP1K-820	UC-5482	5GA-Q82	
C31	75	500		1469-000075			[illegible]	[illegible]		Note 3
C32	120	500								Note 4
C33	1800			SII800	D6-182		GP2L-182	UC-5218	[illegible]	Note 4
C34	10			SII0	D6-100	5W5Q1	GP1K-100	GP1K-100	5GA- Q1	
C35	68									
C36	270			SI270	D6-271	5W5T3	GP2K-271	UC-5327	5GA-T27	
C37	47	200		P288-47		PJ2P5		PT405	2TM-P47	
C38	270	500		1469-0003		5R5T3		MCB241	MS-33	
C39	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C40	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C41	.2	200		P488-22		PTE4P22		TP429	2TM-P22	
C42	.47	200		P288-47		PJ2S5		PT405	2TM-P47	Note 5
C43	.47	200		P288-47		PJ2S5		PT405	2TM-P47	
C44A	1500			BPD-2X0015	DD-2-152	TM5DD15	821-0015	DCD-5215	5HK-2D15	
B	1500									
C45	47			SII47NP0	TCZ-47		NP0K-470	ZT-5447	5TCC-Q47	Note 2
C46	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C47	270			SI270	D6-271	5W5T3	GP2K-271	UC-5327	5GA-T27	
C48A	1500			BPD-2X0015	DD-2-152	TM5DD15	821-0015	DCD-5215	5HK-2D15	
B	1500									
C49	1500			SII500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C50	270			SI270	D6-271	5W5T3	GP2K-270	UC-5327	5GA-T27	
C51	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C52	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C53	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C54	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C55	470			SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C56	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	Note 6
C57	.022	400		P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C58	.001	400		P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SHAW PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C59	.022	400		P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C60	.0022	600		P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C61	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C62	150	500		1469-00015	D6-151	5W5T15	GP2K-151	MC238	1FM-315	
C63	270	500		1469-0003		5R5T3		MCB241	MS-33	
C64	390			SI390	D6-391	5W5T4	GP2K-391	UC-5339	5GA-T39	
C65A	.002			P688-002		PTE6D2	GP2-333-202	PT622	6TM-D2	
B	.005			P688-005	*PC-100	PTE6D5	GP2-333-502	PT625	6TM-D5	
C	.005			P688-005		PTE6D5	GP2-333-502	PT625	6TM-D5	
C66	.0047	600		P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C67	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C68	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C69	.022	400		P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C70	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C71	82	1000								
C72	82	1000								Note 7
C73	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	Note 8
C74	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	Note 8
C75	.47	200		P288-47		PJ2P5		PT405	2TM-P47	Note 9
C76	.022	400		P488-022	DF-203	PTE4S22		PT4122	4TM-S22	
C77	180	500								Note 10
C78	.01	800		P688-01		PTE6S1		PT611	6TM-S1	
C79	.001	1000		P1088-001		PTE16D1		PT1621	MB-D1	Note 11
C80	560	500								
C81	.047	400		P488-047	DF-503	PTE4S47		PT4147	4TM-S47	Note 8
C82	100			SII00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 12
C83	.2	200		P488-22		PTE4P22		TP429	2TM-P22	Note 12
C84	.15	400		P488-15		PTE4P15			4TM-P15	
C85	.047	400		P488-047		PTE4S47		PT4147	4TM-S47	
C86	.22	400		P488-22		PTE4P22		PT4025	4TM-P22	
C87	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C88	500	20000		HV20C	TV3-502	MM-C20TS	413-501		20DK-T5	
C89	51									Note 13
C90	.22	600		684-25		PTE6P25		PT6025	6TM-P25	
C91A	10000			BPD-01	DD-3-103	TM5D81	821-01	DC-511	5HK-281	
B	10000			BPD-01			821-01	DC-511		
C92	270	500		1469-0003		5R5T3		MCB241	MS-33	Note 1
C93	.0022	600		P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	Note 4

Note 1. Used on Runs 301, 302, and 303 only.
Note 2. This item changed to 39MMF on Runs 304-2 and 305-2.
Note 3. Not used on all Runs 304, 304-1 and 304-2.
Note 4. Not used on Runs 301, 302 and 303.
Note 5. Not used on Runs 301, 302, 303, 304, 304-1, 304-2.
Note 6. Some Models use .0047MFD in this application.
Note 7. Item changed to 180MMF on Run 301.
Note 8. Not used on Run 301.
Note 9. Item changed to .22MFD on Run 301.
Note 10. Item changed to 150MMF on Run 301.
Note 11. Item changed to .0022MFD on Run 301.
Note 12. Item changed to .1MFD on Run 301
Note 13. Value may vary or unit may be omitted on some runs.

♦ Items C65A, C65B, C65C, R92A, R92B, R92C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SHAW PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250KΩ	½	P-1414	QJ-444 ♦♦			UF254L } ††	Tone-Panel
B	1Meg	½					UR16-T25 } *	Volume-tapped ⓐ 220KΩ-rear
C	Switch						US-27 }	Attach to R1B
R2A	5000Ω	½	P-1375	QJ-443 ♦	RTV-167		UF53L } ††	Contrast-Panel
B	50KΩ	½					UR54L }	Brightness-Rear
R3A	1Meg	½	P-1017	QJ-161 **	RTV-65	SBB-505	UF16L } †	Vert. Hold-Panel
B	50KΩ	½					UR54L }	Horiz. Hold -Rear
R4A	5000Ω	½	P-1011	QJ-114	AG-19-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	2.5Meg	½	P-1012	QJ-239	AG-84-S	AB-83	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	250KΩ	½	P-1341	QJ-130	AG-64-Z	AB-51	U-44	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A

† Universal Replacement (Mallory exact duplicate part #UE1582).
†† Universal Replacement (Mallory exact duplicate part #UE503)
* Universal Replacement (Mallory exact duplicate part #UE1370S).
** CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B11-137 & P1-121 (Panel) B11-123 & R1-205 (Rear).
♦ CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B11-114 & P1-121 (Panel) B11-123 & R1-205 (Rear).
♦♦ CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B11-130 & P1-121 (Panel) B13-137X & R1-205 (Rear) & SWITCH 76-2.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SHAW PART No.	IRC PART No.	NOTES
R7	15KΩ	½		BTS-15K	
R8	47KΩ	½			
R9	100KΩ	½		BTS-100K	
R10	150KΩ 5%	½			
R11	1500Ω	½		BTS-1500	
R12	100KΩ 5%	½		BTS-100K 5%	
R13	10KΩ	½		BTS-10K	
R14	220KΩ	½			
R15	10KΩ	½		BTS-10K	
R16	15KΩ	½		BTS-15K	
R17	150Ω	½		BTS-150	Note 1
R18	330Ω	½		BTS-330	
R19	10KΩ 5%	½		BTS-10K 5%	
R20	47Ω	½			
R21	1000Ω	½		BTS-1000	
R22	5600Ω 5%	½		BTS-5600 5%	
R23	47Ω	½			
R24	2700Ω 5%	½		BTS-2700 5%	
R25	1000Ω	½		BTS-1000	
R26	150Ω	½		BTS-150	
R27	150Ω	½		BTS-150	
R28	150Ω	½		BTS-150	
R29	150Ω	½		BTS-150	
R30	1000Ω	½		BTS-1000	
R31	10KΩ 5%	½		BTS-10K 5%	
R32	4700Ω 5%	½		BTS-4700 5%	
R33	47Ω	½			
R34	6800Ω 5%	½		BTS-6800 5%	

RESISTORS (CONT.)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SHAW PART No.	IRC PART No.	NOTES
R35	12KΩ	1		BTA-12K	
R36	5600Ω	2		BTB-5600	
R37	100Ω	½		BTS-100	
R38	3300Ω	5		13/4A-3500	
R39	470Ω	1		BTA-470	
R40	3900Ω	1		BTA-3900	
R41	3900Ω	1		BTA-3900	
R42	2.2Meg	½		BTS-2.2Meg	
R43	2.2Meg	½		BTS-2.2Meg	
R44	68KΩ	1		BTA-68K	
R45	22KΩ	½		BTS-22K	
R46	100KΩ	½		BTS-100K	
R47	56KΩ	½		BTS-56K	
R48	56KΩ	½		BTS-56K	
R49	470KΩ	½		BTS-470K	
R50	100Ω	½		BTS-100	
R51	1000Ω	½		BTS-1000	
R52	22KΩ	½		BTS-22K	
R53	100Ω	½		BTS-100	
R54	22KΩ	½		BTS-22K	
R55	1000Ω	½		BTS-1000	
R56	47KΩ	½		BTS-47K	
R57	5.1Ω	½			
R58	22KΩ	½		BTS-22K	
R59	100KΩ	½		BTS-100K	
R60	100KΩ	½		BTS-100K	
R61	27KΩ	½		BTS-27K	
R62	470KΩ	½		BTS-470K	
R63	330Ω	½		BTS-330	Note 3
R64	330KΩ	½		BTS-330K	
R65	330KΩ	½		BTS-330K	
R66	82KΩ	½		BTS-82K	
R67	100KΩ	½		BTS-100K	
R68	39KΩ	½		BTS-39K	
R69	1800Ω	½		BTS-1800	
R70	330KΩ	½		BTS-330K	
R71	470KΩ	½		BTS-470K	
R72	270Ω	1		BTA-270	
R73	680Ω	2		BTB-680	
R74	100KΩ	½		BTS-100K	
R75	820KΩ	½		BTS-820K	
R76	220KΩ	½		BTS-220K	
R77	100KΩ	½		BTS-100K	
R78	1Meg	½		BTS-1Meg	
R79	820KΩ	½		BTS-820K	
R80	22KΩ	½		BTS-22K	
R81	1Meg	½		BTS-1Meg	
R82	470KΩ	½		BTS-470K	
R83	33KΩ	½		BTS-33K	
R84	1.2Meg	½		BTS-1.2Meg	
R85	47KΩ	½		BTS-47K	
R86	2.2Meg	½		BTS-2.2Meg	
R87	15KΩ	2		BTB-15K	
R88	2.2Meg	½		BTS-2.2Meg	
R89	1000Ω	½		BTS-1000	
R90	6800Ω	2		BTB-6800	
R91	1000Ω	½		BTS-1000	
R92A	22KΩ	½		BTS-22K	
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R93	1.5Meg 5%	½		BTS-1.5Meg 5%	
R94	220KΩ	½		BTS-220K	
R95	100KΩ	½		BTS-100K	
R96	1.2Meg	½		BTS-1.2Meg	
R97	10KΩ 5%	½		BTS-10K 5%	Note 2
R98	2.2Meg	½		BTS-2.2Meg	
R99	1800Ω	½		BTS-1800	
R100	1000Ω	½		BTS-1000	
R101	560Ω	½		BTS-560	
R102	560Ω	½		BTS-560	
R103	3300Ω	½		BTS-3300	
R104	100KΩ	2		BTB-100K	
R105	100KΩ	1		BTA-100K	
R106	150KΩ	1		BTA-150K	
R107	330KΩ	1		BTA-330K	
R108	820KΩ	1		BTA-820K	
R109	82KΩ	1		BTA-82K	
R110	330KΩ 5%	1		BTA-330K 5%	
R111	3900 5%	½		BTS-3900 5%	
R112	82KΩ	1		BTA-82K	
R113	68KΩ	1		BTA- 68K	
R114	150KΩ 5%	1		BTA-150K 5%	
R115	8200Ω 5%	½		BTS-8200 5%	
R116	82KΩ 5%	1		BTA-82K 5%	
R117	470KΩ	½		BTS-470K	
R118	100Ω	½			
R119	100Ω	2		BW-2-100	
R120	5.1KΩ 5%	2		BTB-5.1K 5%	Note 4
R121	3.3Ω	½			
R122	470KΩ	1			
R123	56KΩ	½		BTS-56K	
R124	270Ω	2		BW-2-270	
R125A	1380Ω				
B	6750Ω	25			
C	1160Ω				
R126	470KΩ	½		BTS-470K	

Note 1. Used only in Runs 301 and 302.
Note 2. Runs 301, 302, 303, 304, 304-1, 304-2 use an 8200Ω resistor in this application.
Note 3. Some Models may use an 1800Ω resistor in this application.
Note 4. Runs 301 and 302 use a 10KΩ (2 watt) resistor in this application.

♦ Items R92A, R92B, R92C, C65A, C65B, C65C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA SHAW PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC @2.08A	720VCT .250ADC	5VAC @3A	6.3VAC @1.2A SEC. 4 6.3VAC @8.4A		P-8169	P-3059	TP-360 ①	R-37BC	201T10 ① ②

① Drill new mounting holes.
② File cut out.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA SHAW PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	180Ω	950Ω		A-8111	A-4000	TBO-3	A-97K	208T2	Vert. Osc. Trans.
T3	623Ω tap @73Ω	15.7Ω tap @.7Ω, 9.7Ω		A-8130 ① ② ④ ③	HVO-10	TFB-14 ⑤	D-14 ⑤ ②	231T1 ⑦ ⑧	Horiz. Output Trans.
		SEC. 2 0Ω							
T4	1120Ω tap ⑥			A-8123	A-3037	TSO-8	A-102X	222T1	Vert. Output Trans.
	13Ω								
T5A	13Ω			DY-9A	MDF-70	TY-5	Y-21	206D1	Horiz. Deflection Coils
B	48Ω								Vert. Deflection Coils
T6	8Ω tap @5Ω					TL-3		207R1	Horiz. Lin.Coil
T7	1.2Ω			MWC-2 ⑦		TW-2		201R4	Width Coil

① Use with width coil WC-5.
② Drill new mounting holes.
③ Remove connection to corona button and dress lead thru terminal plate.
④ See instruction sheet (Schematic #3) packed with unit for terminal connections.
⑤ Use original mounting plate.
⑥ Use with width coil WC-11.

⑧ See instruction sheet packed with unit for terminal connections.

SHAW CHASSIS
224 (Runs 301, 302, 303, 304, 304-1, -2, 305, 305-2)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		SHAW PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T8	6.1KΩ	3 to 4Ω	290Ω	.46Ω	T1415	A-3877 ①	A-2926 ①	RO-9 ①	S-3X ①	

① Drill one new mounting hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SHAW PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.250ADC	38.5Ω	1HY	NE-712C-1	C-2326 ①	C-2996 ①	TR-1733 ①	C-23X

① Drill one new mtg. hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	SHAW PART No.	MILLER PART No.	MEISSNER PART No.	
L2	Ant. Coils	0ΩCT	0Ω				
L3	Fil. Choke	0Ω					
L4	Neutr. Coil	0Ω					
L5	RF, Mixer Grid & Osc. Coils	0Ω					
L6	Fil. Choke	0Ω					
L7	RF Choke	0Ω					
L8	RF Choke	1.3Ω					
L9	1st. Video IF	1.1Ω			6188*	17-1003	
L10	Fil. Choke	0Ω			4604		1.44 Microhenery
L11	2nd. Video IF & Sound Take Off	.2Ω	0Ω		6185	17-1020	Sec. Tapped
L12	3rd. Video IF	.1Ω			6186	17-1001	Includes Trap
L13	4th. Video IF	.6Ω	.6Ω				Includes Trap-See Note 1
L14	Cathode Trap	.2Ω	0Ω		6193	'20-1021	Not used in all models.
L15	4.5MC Trap	1Ω			1470	20-1004	
L16	Series Peak. Coil	5Ω			6178	19-4125	120Microheneries :Wound on 22KΩ Resistor
L17	Shunt Peak. Coil	7.5Ω			6181	19-3250	250 Microheneries
L18	Shunt Peak. Coil	4.2Ω			6177	19-3093	93 Microheneries
L19	Shunt Peak. Coil	7.5Ω			6181	19-3250	250 Microheneries
L120	Series Peak. Coil	5Ω			6178	19-4125	120 Microheneries:Wound on 22KΩ Resistor
L21	Sound IF	.2Ω	.1Ω		6190	17-1011	
L22	Discriminator	.1Ω	0Ω CT		6192	17-1013	
L23	Horiz. Osc.	70Ω			6183	20-1402	Pri. tap ⓐ 55Ω, horiz. waveform = 42Ω

Note 1. Used in runs 304, 304-1, 304-2, 305, & 305-2 only. For runs 301, 302, & 303 see alternate circuit.
* Enlarge mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SHAW PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1 *	3AG	5A 250V			312005 (3AG-5A)	357001	MTH5	4405
M2	3AG P/T	1/4A 250V			318.250 (3AG-1/4A-P/T)		GJV-1/4	

* Not used in all models.

MISCELLANEOUS

ITEM No.	PART NAME	SHAW PART No.	NOTES
M3	RF Tuner		
M4	Switch		TV-Phono
M5	Centering Magnet		Mounted on rear of yoke cover. (Part of yoke assembly.)
M6	Ion Trap		
B3	Trimmer		Horiz. Lock (10-160MMF)
B4	Trimmer		Horiz. Drive (40-370MMF)

TROUBLE SHOOTING AIDS (CONT.)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Substitute V18, V19, V20 and V21. Check waveform at W14.

If Satisfactory	If Unsatisfactory
Check C81, T3 and other components associated with V20 and V21.	Check C78, C79 and C80. Check other components of the horizontal oscillator and coupling circuits.

WEAK HIGH VOLTAGE

Substitute V18, V19 and V20.
Check C88, R121 and R122. Proceed as outlined under LOSS OF HIGH VOLTAGE.

BLOOMING

Substitute V20, V21 and V19.
Check R121 and R122.
Check C88.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

POWER

SMALL RASTER, DIM PICTURE, WEAK SOUND

Substitute V22. Check B+ filter network for shorts and leaky filter capacitors.

DIM PICTURE

Substitute V22. Check picture tube. Check B+ network for shorts and filter capacitors for leaky condition.

GENERAL

NO PICTURE, NO SOUND, NO SNOW

Substitute V2 and V3.

SHOWY PICTURE, WEAK SOUND (HIGH SIGNAL AREAS)

Substitute V1.

SOUND, NO PICTURE

Substitute V4, V5, V6, V7 and V8.

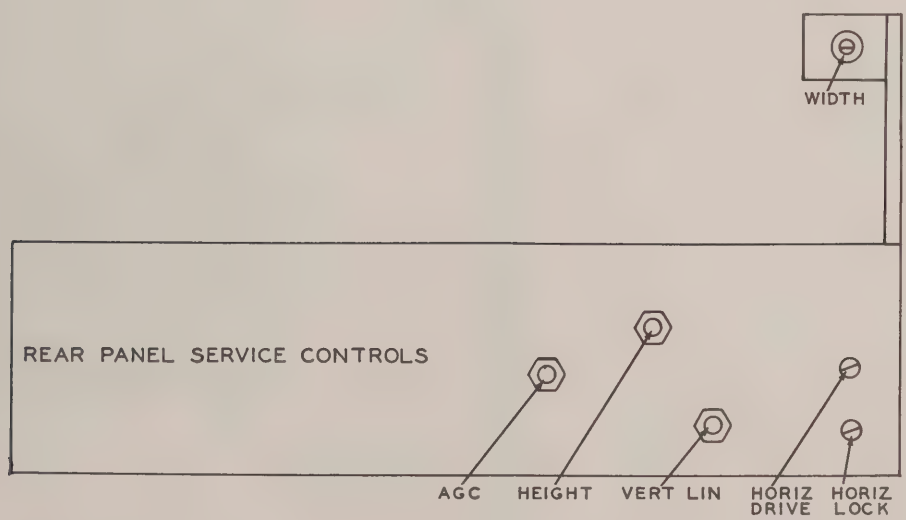
SNOWY PICTURE, GOOD SOUND (HIGH SIGNAL AREAS)

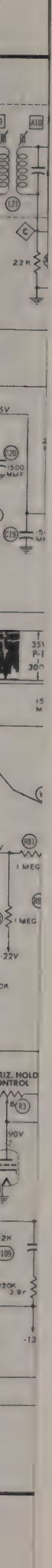
Substitute V4 and V5.

INTERMITTANT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiving equipment.





Property of
L. F. [illegible]
DENVER

TELE KING
MODEL RK51A (Ch. RE-1)

TELE KING
MODEL RK51A (Ch. RE-1)

TRADE NAME	Tele King Model RK51A (Ch. RE-1)
MANUFACTURER	Tele King Corp., 601 W. 26th. St., New York 1, N.Y.
TYPE SET	AC/DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC/DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1650KC	"	"	A5	"
3.		Loop	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TELEKING
MODEL RK51A (Ch.RE-1)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		TELE KING PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	TELE KING PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	30	150	CET-13	PRS150/50-30		EDL5315		2N520	TVA-2450	Yellow
B	50	150								Red
C2	.05	200	CP-2-15	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	220		CC-322	SI220	D6-221	5W5T25	GP2K-221	UC-5322	5GA-T22	
C4	.005	600	CP-2-25	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C5	100	-	CC-31	SI100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C6	.01	400	CP-4-11	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C7	.02	600	CP-4-12	P688-02	D6-203	PTE6S2		PT612	6TM-S2	
C8	.02	600	CP-6-12	P688-02	D6-203	PTE6S2		PT612	6TM-S2	
C9	.05	600	CP-2-15	P688-05		PTE6S5		PT615	6TM-S5	

CONTROLS

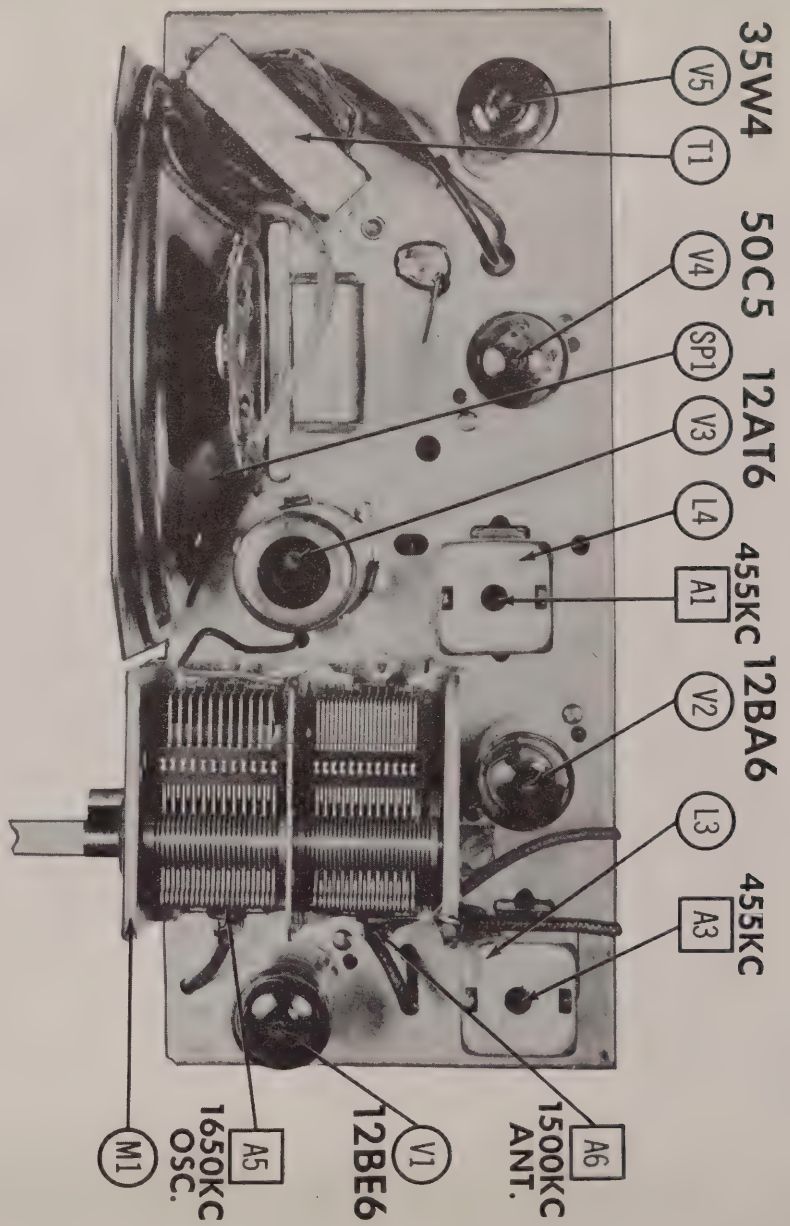
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TELE KING PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY FART No.	
R1A	1Meg	½	P-23	Q13-137	AG-63-Z	B-70-S	U-53	Volume.
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TELE KING PART No.	IRC PART No.	
R2	22KΩ	½	RC-223-2	BTS-22K	
R3	220Ω	½	RC-221-2	BTS-220	
R4	1Meg	½	RC-105-1	BTS-1Meg	
R5	6.8Meg	½	RC-685-1	BTS-6.8Meg	
R6	270KΩ	½	RC-274-1	BTS-270K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TELE KING PART No.	IRC PART No.	
R7	470KΩ	½	RC-474-1	BTS-470K	
R8	150Ω	½	RC-151-2	BTS-150	
R9	16Ω	½			
R10	1800Ω	1	RC-182-4	BTA-1800	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	TELE KING PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	PMS-7	ST-113 Mod. P4-X	4A07	

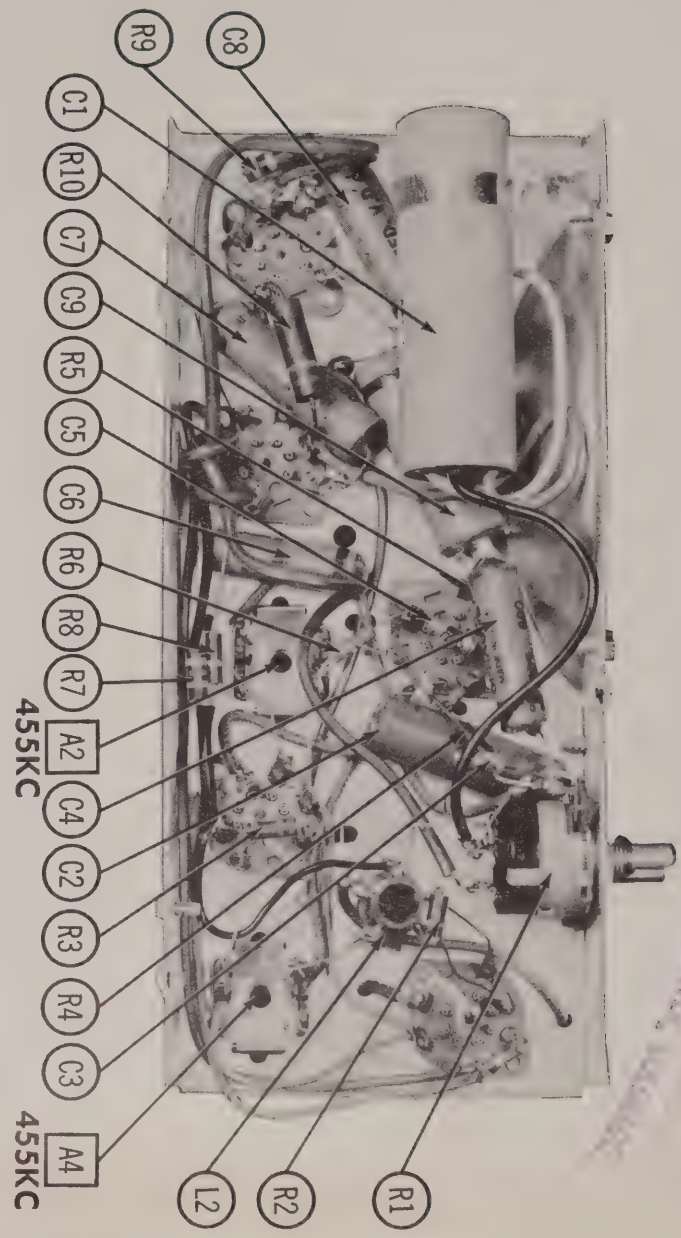
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	TELE KING PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Loop Ant.	3.4Ω		LA-5			
L2	Osc. Coil	.6Ω	8Ω	LO-5			
L3	Input IF	17Ω	17Ω	LIF-13	12-C1	16-6758	
L4	Output IF	17Ω	17Ω	LIF-13	12-C2	16-6758	

MISCELLANEOUS

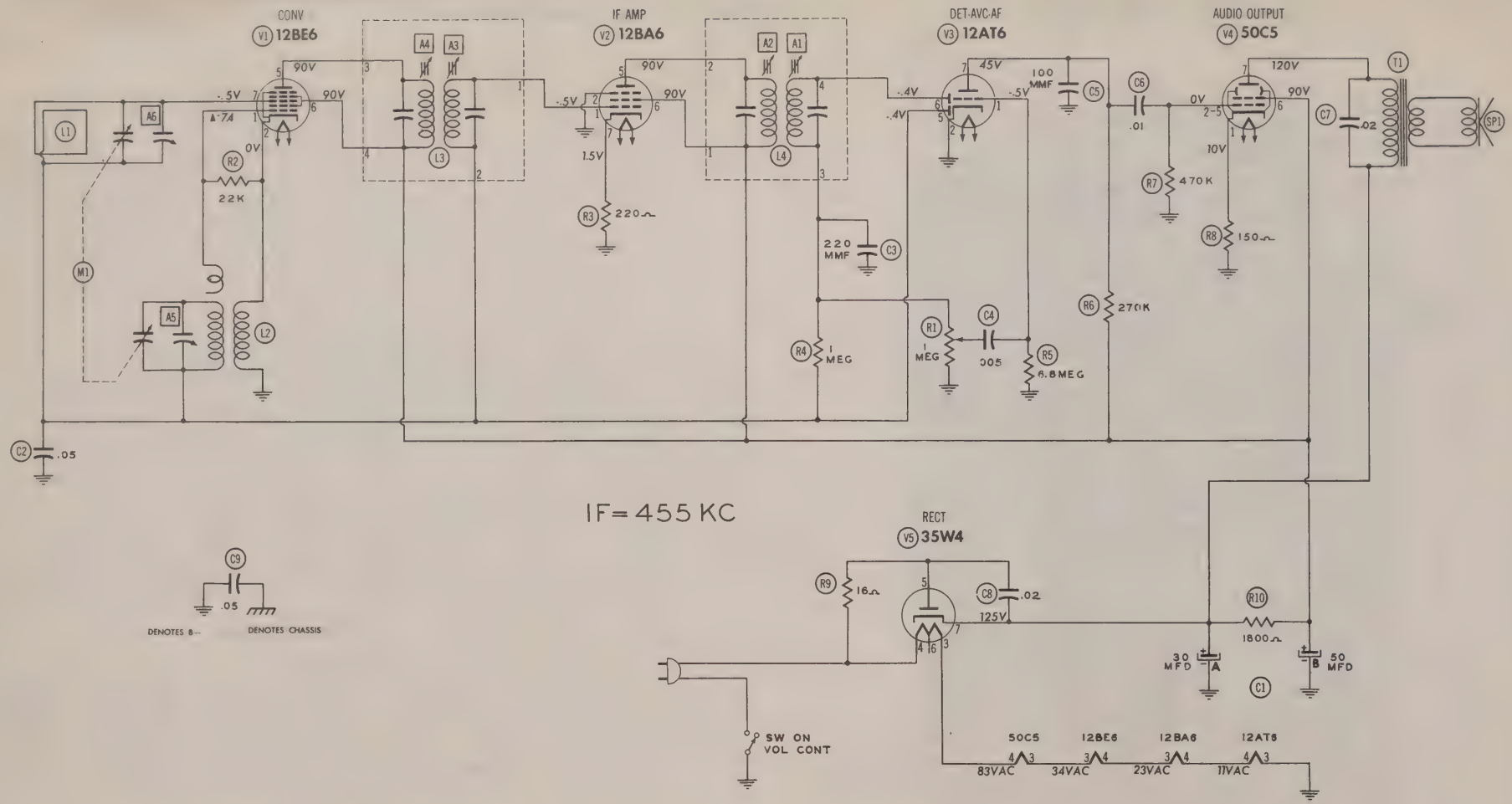
ITEM No.	PART NAME	TELE KING PART No.	NOTES
M1	Tuning Capacitor	CV-4	25-390MMF, 26-170MMF

CHASSIS—BOTTOM VIEW



TELEKING
MODEL RK5IA (Ch. RE-1)

TELEKING
MODEL RK5IA (Ch. RE-1)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	36Ω	24Ω	†1.8KΩ	†1.8KΩ	2Meg
V 2	12BA6	2Meg	0Ω	24Ω	12Ω	†1.8KΩ	†1.8KΩ	220Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	2Meg	1Meg	†270KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	†1.8KΩ	†226Ω
V 5	35W4	†0Ω	INF	86Ω	112Ω	128Ω	104Ω	500KΩ

▲ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM PIN 7 OF V5.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1953

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

WESTINGHOUSE MODELS H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21, H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
L. F. BLANKENSHIP
3922 HOLLY ST.
DENVER, COLORADO

MODEL H-722K21

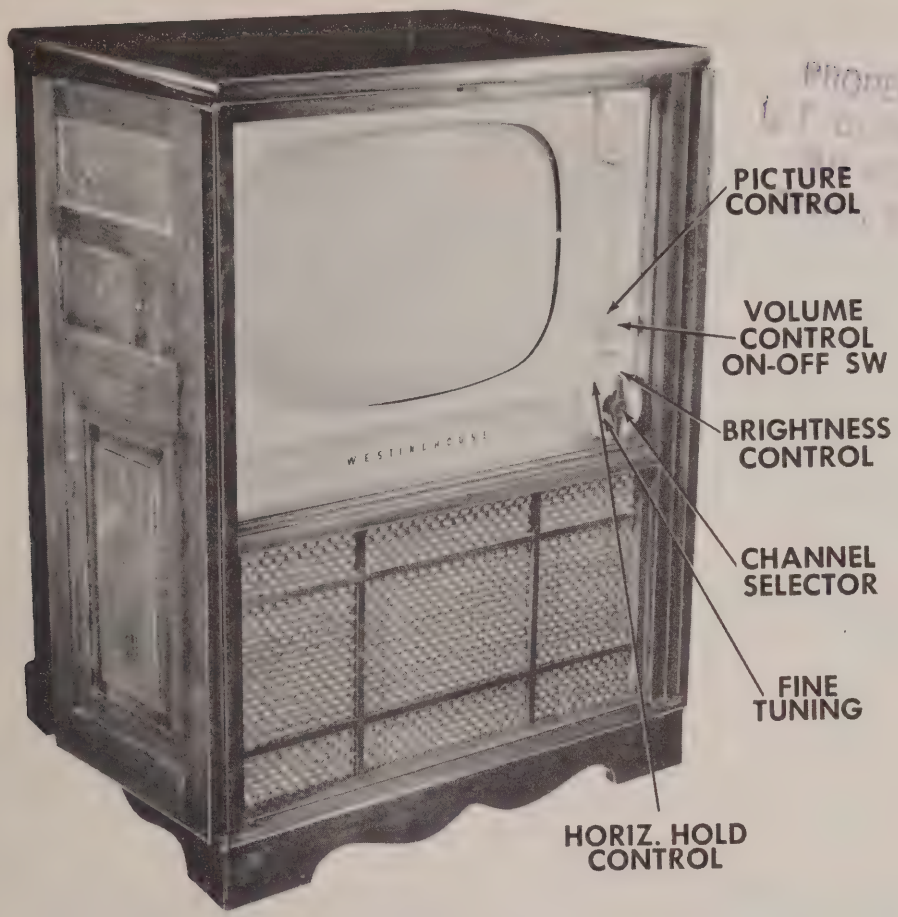
WESTINGHOUSE MODELS H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21, H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 5–53 SET 202 FOLDER 10

WESTINGHOUSE MODELS H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21 (Ch. V-2217-4, -5), H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5)



WESTINGHOUSE MODEL H-722K21 (Ch. V-2217-5)

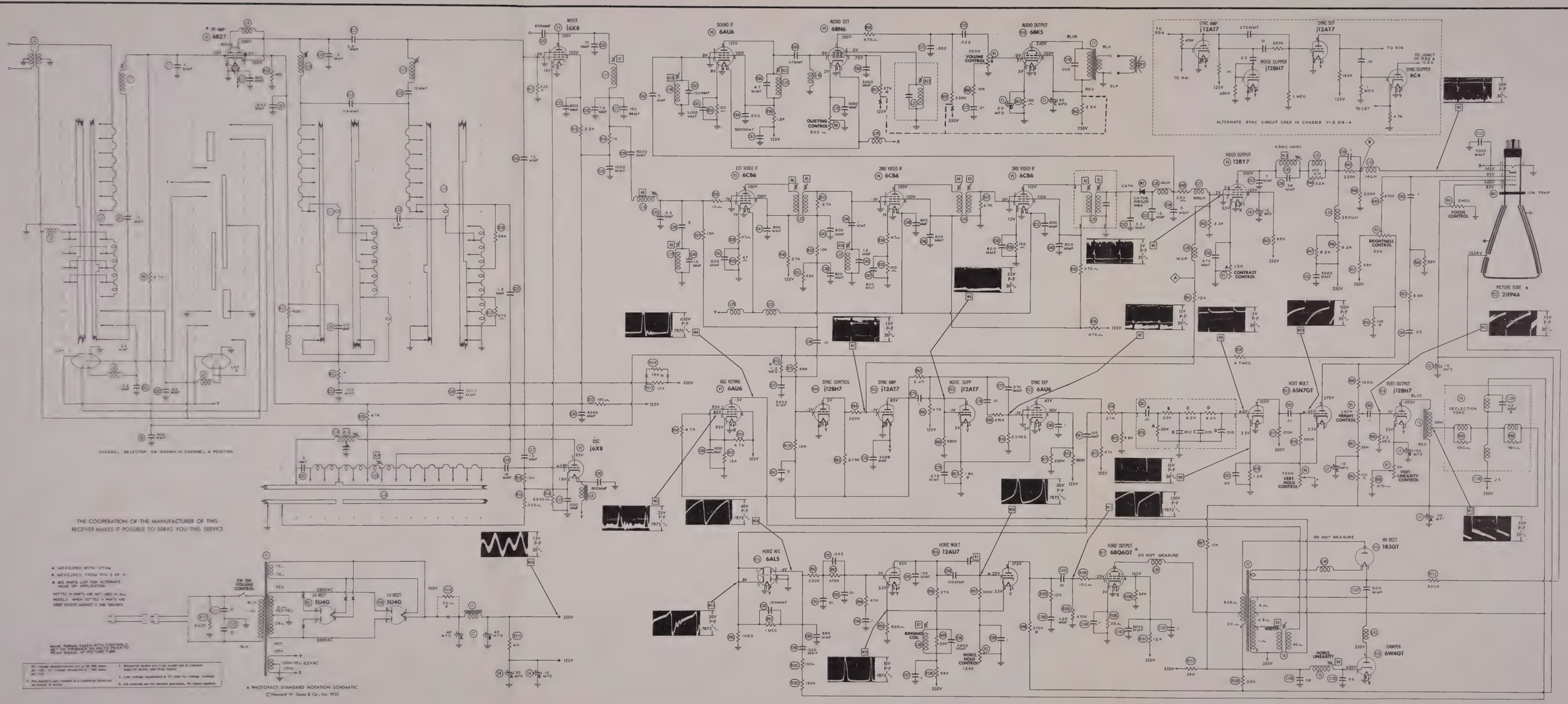
TRADE NAME	Westinghouse Models H-704T17 (V-2216-4, -5) H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21 (Ch. V-2217-4, -5) H-723K21 (Ch. V-2217-5) H-737T17 (Ch. V-2216-5) H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21(Ch. V-2217-4, -5)
MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Sunbury, Pennsylvania
TYPE SET	Television Receiver
TUBES	Twenty-Two
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 2.12 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet-Rear View 11
Capacitor and Alignment Identification 4, 9
Chassis - Top View 3
RF Tuner 10
Photographs (Cont)
Resistor and Inductor Identification 19, 20
Resistance Measurements 8
Servicing in the Field 18
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

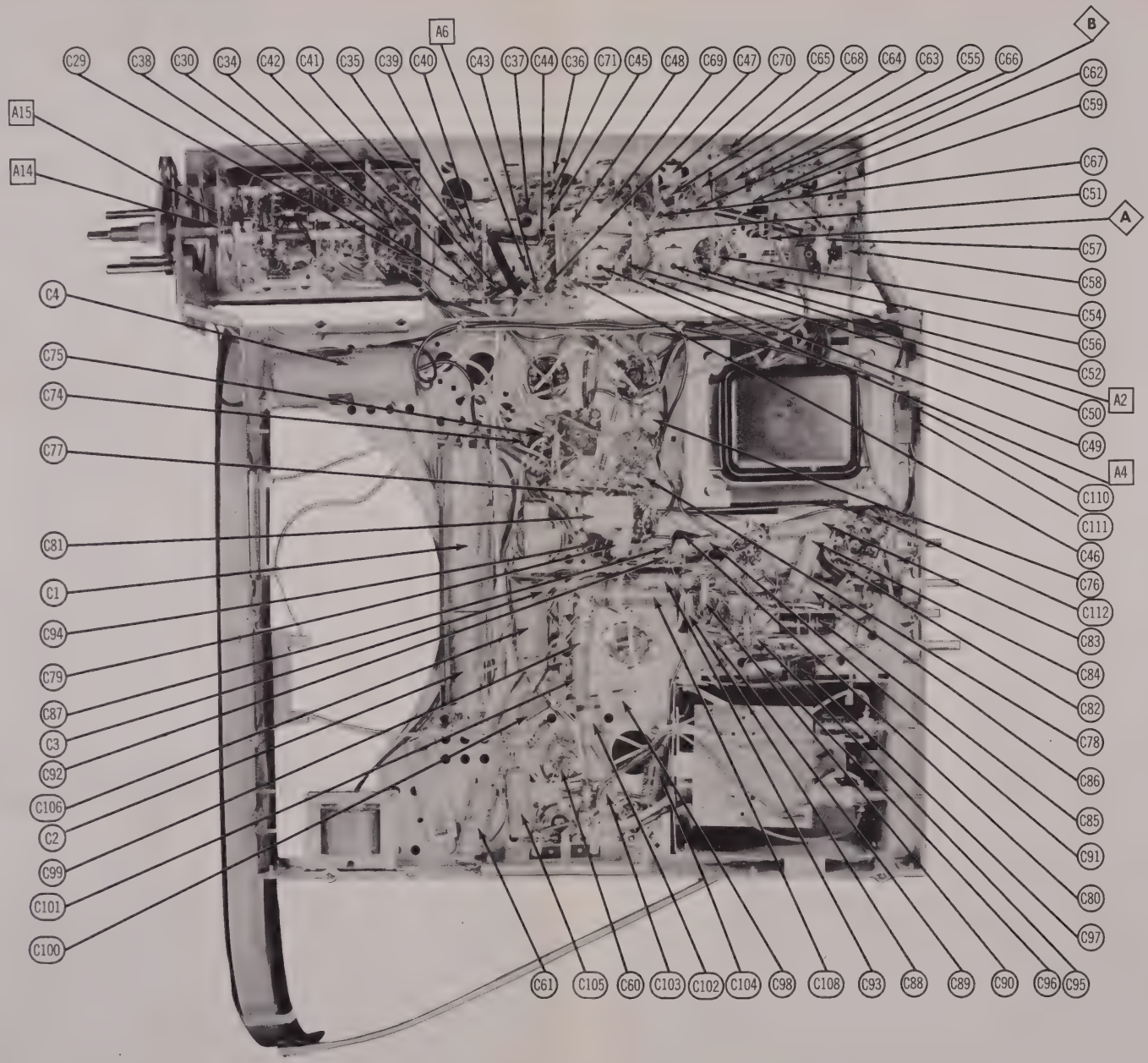
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1953 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


RF AMP 6BZ7
MIXER 6X8
SOUND IF 6AU6
AUDIO DET 6BN6
AUDIO OUTPUT 6BK5
1ST VIDEO IF 6CB6
2ND VIDEO IF 6CB6
3RD VIDEO IF 6CB6
VIDEO OUTPUT 12BY7
SYNC AMP 12AT7
SYNC SEP 12AT7
NOISE CLIPPER 12BH7
SYNC CLIPPER 6C4
ALTERNATE SYNC CIRCUIT USED IN CHASSIS V-2 216-4
OSC 6X8
AGC KEYING 6AU6
SYNC CONTROL 12BH7
NOISE SUPP 12AT7
SYNC SEP 6AU6
VERT MULT 6SN7GT
VERT OUTPUT 12BH7
HORIZ AFC 6AL5
HORIZ MULT 12AU7
HORIZ OUTPUT 6BQ6GT
HV RECT 1B3GT
DAMPER 6W4GT
LV RECT 5U4G
LV RECT 5U4G
PICTURE TUBE 21FP4A
ION TRAP
FOCUS CONTROL
BRIGHTNESS CONTROL 50K
CONTRAST CONTROL 1.5K
VERT. HOLD CONTROL 750K
VERT. HEIGHT CONTROL 5K
VERT LINEARITY CONTROL 10K
HORIZ HOLD CONTROL 125K
HORIZ LINEARITY
WIDTH
DEFLECTION YOKE
SW ON VOLUME CONTROL
QUIETING CONTROL 500
VOLUME CONTROL 560K
CHANNEL SELECTOR SW SHOWN IN CHANNEL 4 POSITION
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A MEASURED WITH VTVM
B MEASURED FROM PIN 3 OF V1
C SEE PARTS LIST FOR ALTERNATE VALUE OF APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED REFER ADDENDA FOR VALUES
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1 Measured values are from a color bar tri-modulator signal as shown above.
2 For readers who need it a functional definition of terms.
3 Line voltage maintained at 117 volts for voltage readings
4 All controls set for normal operation, No signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953
DO NOT MEASURE

WESTINGHOUSE MODELS H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21, H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5)

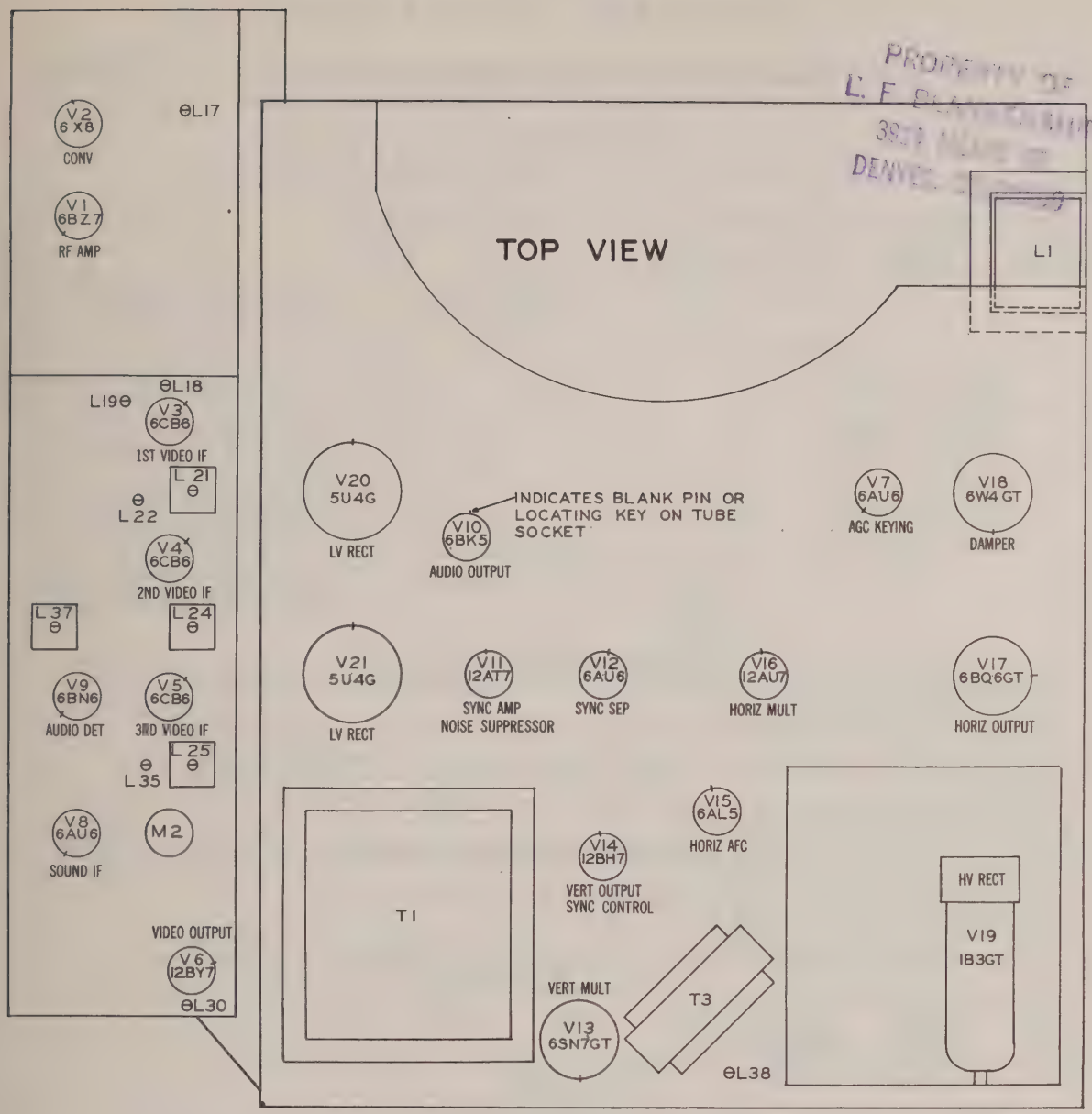
WESTINGHOUSE MODELS H-704T17 (Ch. V-2216-4, -5), H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21, H-722K21, H-723K21 (Ch. V-2217-4, -5), H-737T17 (Ch. V-2216-5), H-751T21, H-752T21, H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217-4, -5)

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V20, V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V22
Has pic, no sound-V8, V9, V10
Overloaded picture-V7

SYNC FAILURE
No vert. sync-V12, V13
No horiz. sync-V12, V15, V16
No vert. or horiz. sync-V11, V12

SWEEP FAILURE
No raster, has sound-V16, V17, V18, V19, V22
No vertical deflection-V13, V14
Poor vert. linearity or foldover-V13, V14
Poor horiz. linearity or foldover-V16, V17, V18
Narrow picture-V16, V17, V18, V19, V20, V21
Vert. off freq. -V12, V13
Horiz. off freq. -V12, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the 6BZ7 or 6BQ7 RF Amplifier tube from its socket to eliminate it as a possible source of interference during alignment.
Connect the negative lead of a 9 volt bias supply to the AGC line. Connect the positive lead to chassis. When connecting the sweep generator to the various stages of the video IF strip make the ground connection to chassis as close as possible to the grounding point for that stage.
When adjusting slugs, if two peaks are obtained use the one with slug at farthest counter clockwise position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp)	42.25MC 43MC 44MC 45MC 45.75MC	13	Vert. amp thru network as in Fig. 1 to point (A) Low side to chassis.	A1, A2	Detune plate circuit of V4 by clipping an alligator clip to pin 5 of V4. CAUTION B+. Adjust for response curve of maximum height and symmetry as in Fig. 2.
2.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	"	"	"	A3, A4	Move the alligator clip to pin 5 of V3. Adjust for curve of maximum height and symmetry as in Fig. 3)
3.	"	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	"	"	"	"	A5, A6	Remove alligator clip from pin 5 of V3. Adjust for curve of maximum height and symmetry as in Fig. 4.
4.	"	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	"	44MC	"	"	A7, A8	Rreset A9 completely clockwise. Adjust A7 for maximum response . Adjust A8 for symmetrical top to response. 44MC should be at center of flat-top response curve.
5.	"	"	"	41.25MC 42.25MC 43MC 44MC 45MC 45.75MC	"	"	A9	Adjust for MINIMUM response at 41.25MC. Check for response as in Fig. 5. If necessary retouch A7 and A8 for desired response.

SOUND ALIGNMENT USING TV STATION SIGNAL

Tune to a TV station and connect an attenuator in the antenna input circuit so that input signal can be varied from weak to strong.
Set the quieting control to mid-position.
Adjust A10 and A11 for maximum program sound.
If two peaks are obtained use the one with slugs at farthest counter clockwise position. Reduce signal to lowest usable level and recheck settings of A10 and A11.
Apply a strong signal to receiver and adjust A12 for maximum program sound. If two peaks occur at widely separated positions, use the one with the slug farthest counter clockwise. If the peaks occur close together increase the signal strength or readjust the quieting control.
Use a very weak signal input so that noise is heard and adjust quieting control for minimum noise.
Correct setting will usually be near mid-position.
Do not leave control at full counter clockwise position.

SOUND ALIGNMENT USING SIGNAL GENERATOR

Connect an oscilloscope or AC voltmeter across volume control.
Apply 4.5MC FM signal (7.5KC Swp) to point (A) .
Use lowest signal level that will produce an output indication and adjust A10 and A11 for maximum output.
Apply a strong signal and adjust A12 for maximum output.
Apply 4.5MC AM signal (400∿ Mod.) to point (A).
Starting with a low level signal, increase the signal input while rotating the quieting control until signal level reaches a point where AM output indication dips to zero with a rising indication on each side of zero. Set quieting control for zero output at this signal level.

4.5MC TRAP ALIGNMENT

Set contrast control at maximum clockwise rotation.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	13	DC probe thru detector (Fig. 6) to point (B) Common to chassis.	A13	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Replace the 6BZ7 or 6BQ7 RF Amplifier tube in its socket. Remove the bias battery if not previously removed. Tune in TV station operating on highest low band channel in vicinity. Set fine tuning control at center of range (set screw on fine tuning drive wheel will be straight up). Adjust A14 for best picture detail.
Switch to highest high band TV station operating in the vicinity. Adjust A15 for best picture detail.
Check low band station and retouch A14 slightly if necessary.

ADJACENT CHANNEL 47.25MC TRAP

If adjacent channel interference is not experienced in the receiving area A16 should be adjusted to its maximum counter clockwise position.
In case of interference tune the set to the channel where interference is noted and starting from counter clockwise position adjust A16 until interference is eliminated. In some cases this adjustment may affect the video IF alignment making it necessary to repeat step 3.

RF ALIGNMENT

The RF portion of this receiver has been correctly aligned at the factory and is very stable.
Alignment of this portion should not be required in the field.

ALIGNMENT INSTRUCTIONS (CONT.)

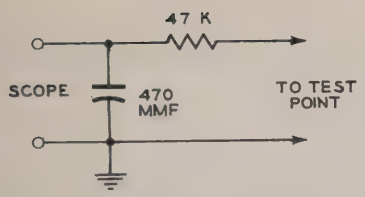


FIG. 1

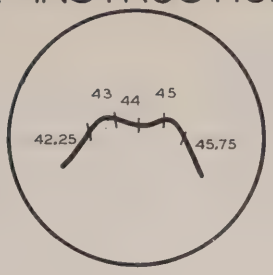


FIG. 2

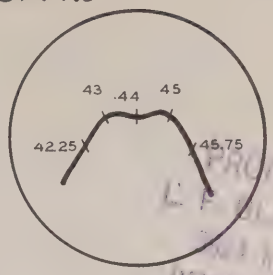


FIG. 3

PROPERTY OF
DENVER, COLORADO

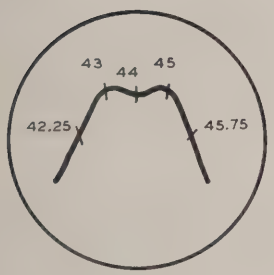


FIG. 4

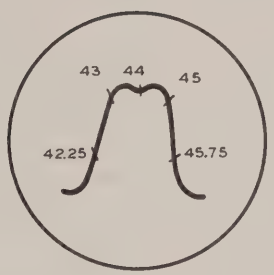


FIG. 5

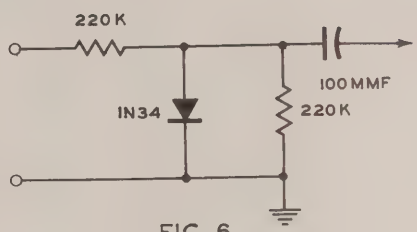
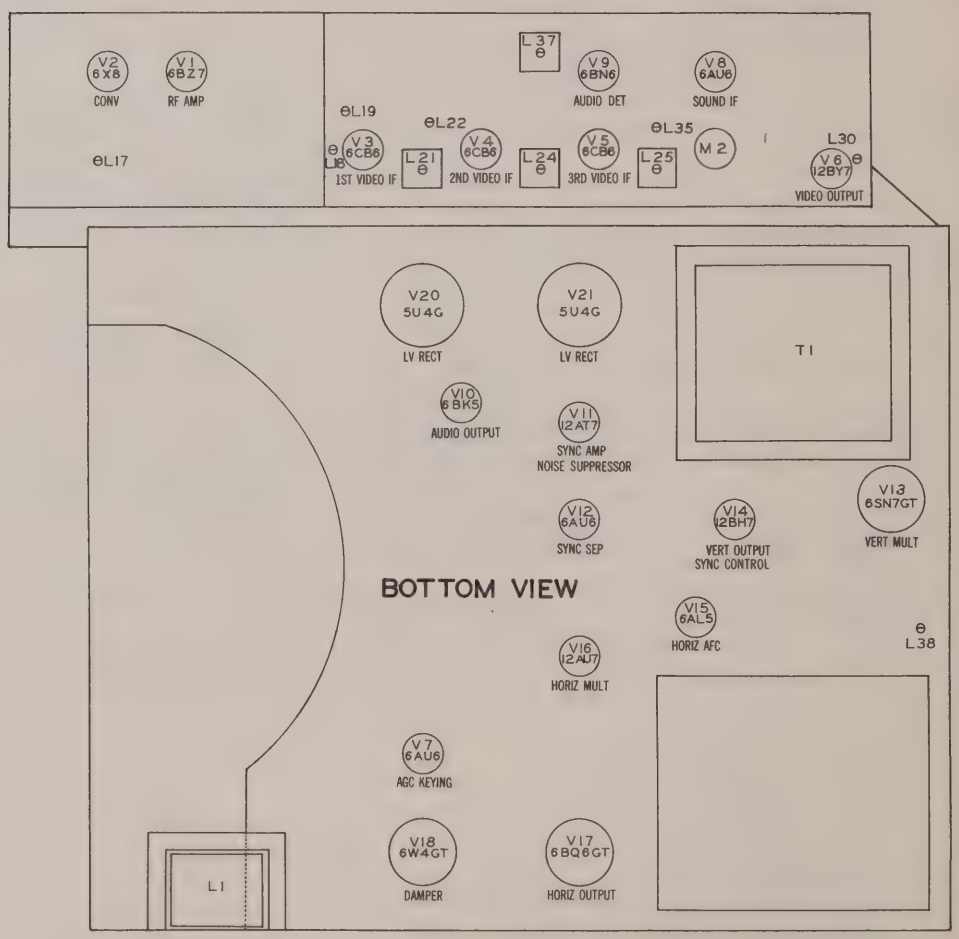


FIG. 6

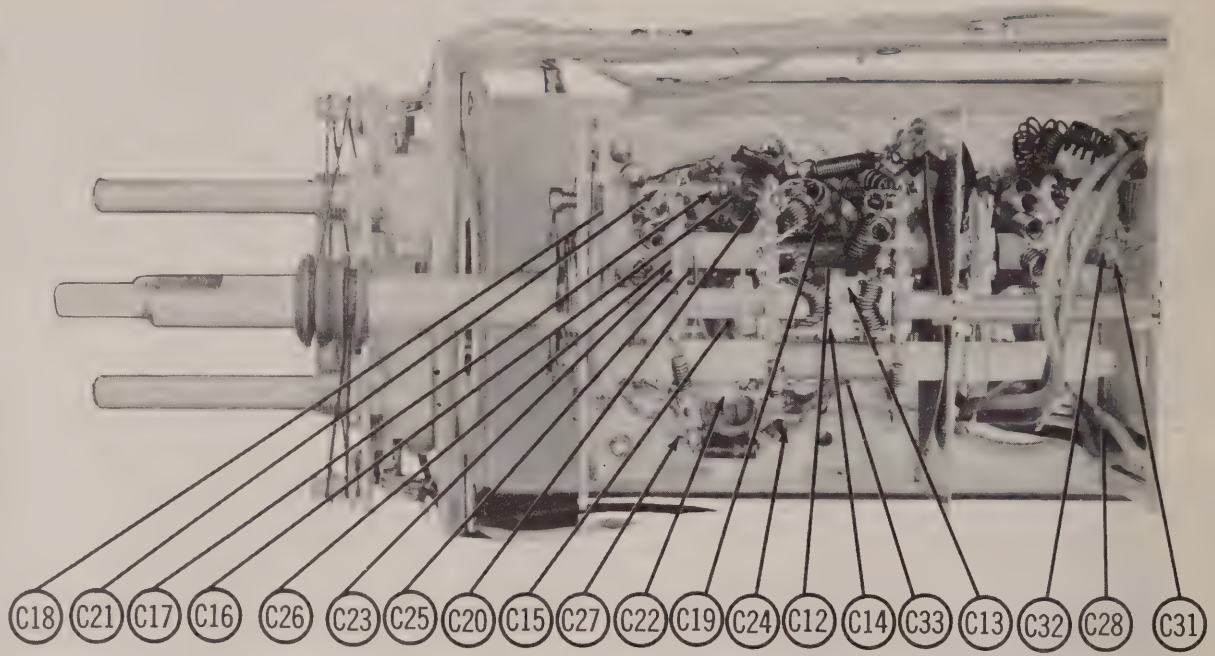
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	1.7Meg	1Meg	INF	.1Ω	0Ω	INF	1.3Meg	0Ω	0Ω
V 2	6X8	0Ω	15.2KΩ	†8.8KΩ	0Ω	.1Ω	2.2Meg	220KΩ	†6.3KΩ	6.7KΩ
V 3	6CB6	43KΩ	94Ω	.1Ω	0Ω	†6.8KΩ	†6.8KΩ	0Ω		
V 4	6CB6	43KΩ	147Ω	.1Ω	0Ω	†4.6KΩ	†4.6KΩ	0Ω		
V 5	6CB6	.5Ω	150Ω	.1Ω	0Ω	♯5KΩ	♯5KΩ	0Ω		
V 6	12BY7	120Ω	3.3KΩ	0Ω	.1Ω	.1Ω	0Ω	4.1KΩ	†68KΩ	0Ω
V 7	6AU6	†15KΩ	15KΩ	.1Ω	0Ω	100KΩ	†3.5KΩ	15KΩ		
V 8	6AU6	.3Ω	0Ω	.1Ω	0Ω	†5KΩ	†5KΩ	120Ω		
V 9	6BN6	300Ω	9Ω	.1Ω	0Ω	†30KΩ	5.5Ω	†330KΩ		
V 10	6BK5	†3KΩ	INF	10Ω	.1Ω	0Ω	150Ω	INF	†3KΩ	INF
V 11	12AT7	†11KΩ	14KΩ	0Ω	.1Ω	.1Ω	680KΩ	680KΩ	†1.8KΩ	0Ω
V 12	6AU6	2.2Meg	0Ω	0Ω	.1Ω	†25KΩ	†140KΩ	1.8KΩ		
V 13	6SN7GT	50KΩ	100KΩ	1.2KΩ	1.4Meg	†540KΩ	1.2KΩ	.1Ω	0Ω	
V 14	12BH7	120KΩ	100KΩ	0Ω	.1Ω	.1Ω	♯11KΩ	2.2Meg	25KΩ	0Ω
V 15	6AL5	1 Meg	0Ω	0Ω	.1Ω	1 Meg	0Ω	2 Meg		
V 16	12AU7	†90KΩ	2.9 Meg	820Ω	.1Ω	.1Ω	†340KΩ	300KΩ	820Ω	0Ω
V 17	6BQ6GT	INF	0Ω	INF	†10KΩ	470KΩ	INF	.1Ω	33Ω	Top Cap ♯50Ω
V 18	6W4GT	INF	INF	30KΩ	INF	†50KΩ	INF	.1Ω	0Ω	
V 19	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ♯580Ω
V 20	5U4G	INF	10KΩ	INF	29Ω	INF	31Ω	INF	10KΩ	
V 21	5U4G	INF	10KΩ	INF	29Ω	INF	31Ω	INF	10KΩ	
V 22	21FP4A	0Ω	Pin 2 30KΩ	Pin 6 ♯ 280KΩ	Pin 10 ♯33KΩ	Pin 11 120KΩ	Pin 12 .1Ω			

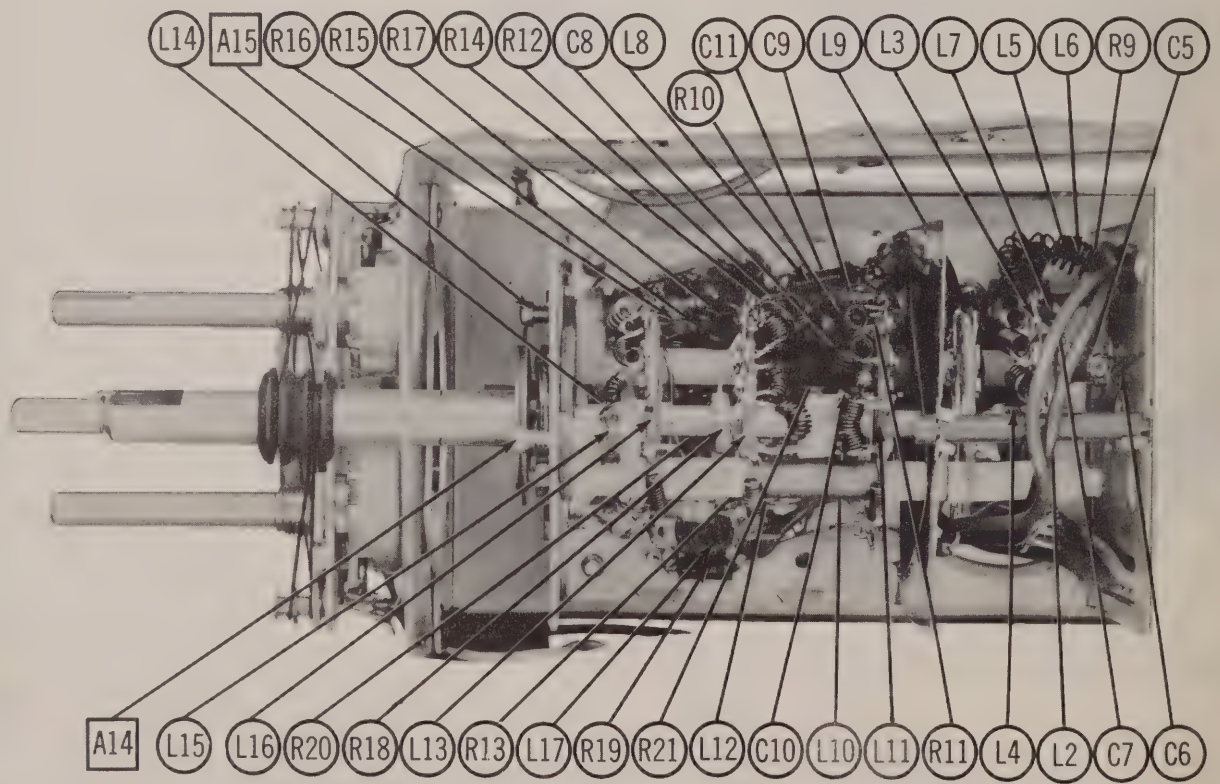
† MEASURED TO PIN 8 OF V20
♯ MEASURED TO PIN 3 OF V18



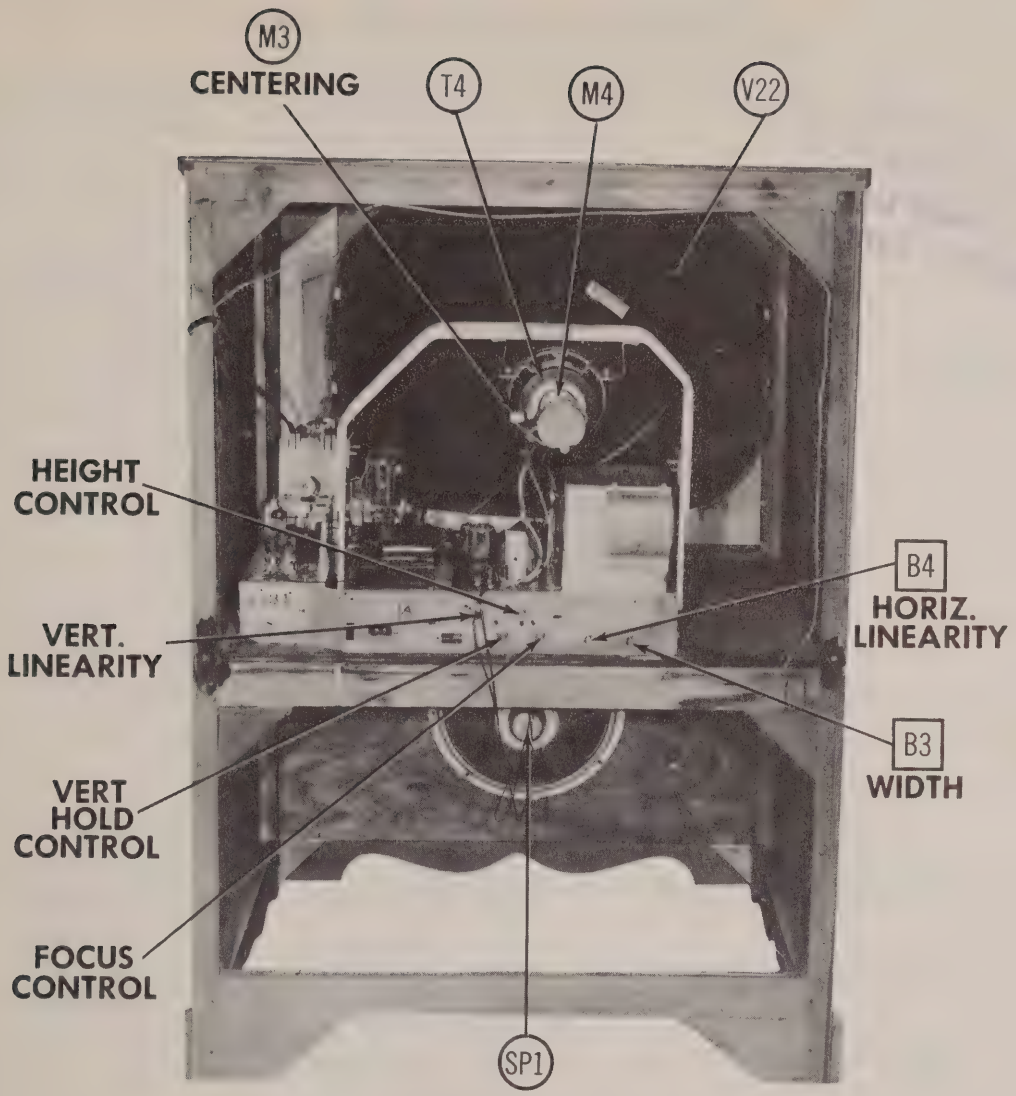
TUBE PLACEMENT CHART



RF TUNER-BOTTOM VIEW



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station preferably a test pattern.

Set the horizontal hold control to the center of its range.

Short out the ringing coil, L38, with a short wire jumper.

Connect a VTVM to the junction of R94 and C94, with common lead to chassis.

Adjust the multivibrator trimmer (B1) for zero deflection on VTVM. If zero voltage can be approached, but not reached it may be necessary to set the horizontal hold control slightly to one side of center to obtain zero voltage.

Remove the jumper from L38 and adjust the ringing coil slug (B2) for zero voltage at VTVM. Remove VTVM.

Check sync pull in by switching momentarily to another channel and back. Picture should fall into sync immediately.

Adjust the width control slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check horizontal output transformer and yoke for loose connections, cold solder joint, or open winding.

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21.
Check waveform W17.

If Unsatisfactory	If Satisfactory
Check components of horizontal multivibrator. Check coupling network between V16 and V17.	Check components of horizontal output tube, particularly C102, C103 and C104.

DRIVE LINES

Substitute V17 and V18. Check associated components.

COMPRESSED AT LEFT SIDE

Substitute V17 and V18.
Check wavelform W17.

If Unsatisfactory	If Satisfactory
Check coupling and shaping network between V16 and V17.	Check T2, T4 and T5.

FOLDS

Substitute V18. Check T4, T5 and ofther components of horizontal output and dampen circuits.

VERTICAL

LOSS OF SWEEP

Check by substitution V13 and V14.
Check waveform at W11.

If Unsatisfactory	If Satisfactory
Check components of vertical multivibrator and coupling network between V13 and V14.	Check components of vertical outptt tube, particularly T3 and T4B.

INSUFFICIENT SWEEP

Substitute V13 and V14. Check components of V14.

COMPRESSED AT TOP

Substitute V14. Check coupling network between V13 and V14.

COMPRESSED AT BOTTOM

Substitute V14. Check C2A and C2B.
Check T3 and T4B.

FOLDS

Substitute V13 and V14. Check components, especially T3 and T4.

FOLD AT TOP, STRETCHED AT BOTTOM

Check C84 for open.

SYNC

HORIZONTAL

LOSS OS SYNC

Check by stustitution, V7, V11, V12, V13 and V14. Check associated components.

CRITICAL HOLD

Check by substitution V7, V11, V12, V13 and V14. Check coupling and waveshaping components.

PULLING

Substitute V15 and V16. Check coupling network between V15 and V16.

VERTICAL

LOSS OF SYNC

Substitute V11, V12 and V13. Check output from sync separator for vertical sync pulses.

If Unsatisfactory	If Satisfactory
Trace signal back, stage by stage. Check components of faulty stage.	Check vertical integrating network and vertical oscillator circuit.

CRITICAL HOLD

Substitute V11, V12 and V13.
Follow procedure outlined under LOSS OF SYNC.

TRIGGERING

Substitute V13 and check associated circuit components.

VIDEO

SOUND BARS

Check adjustment of A13 (4.5MC trap) in video amplifier circuit. Check local oscillator adjustment and video IF alignment.

POOR RESOLUTION

Substitute video IF tubes.
Check video IF alignment.
Check associated components.

SMEAR

Substitute V6. Check associated components, expecially the peaking coils.

ONE WIDE BLACK BAR

Check tuner, video IF and video output tubes for filament to cathode leakage.

POOR CONTRAST

Substitute V6. Check waveform W2.

If Unsatisfactory	If Satisfactory
Check tuner and video IF tubes and components.	Check picture tube. Check V22 grid circuit components.

AUDIO

WEAK, OR NO SOUND

Substitute V8, V9 and V10. Check T7 and speaker. Check adjustment of gated beam detector following instructions outlined in alignment data.

DISTORTED

Check audio amplifier using audio signal generator and scope.

If Undistorted	If Distorted
Check detector adjustment. Check video IF alignment.	Check components of audio amplifier.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	6BZ7	6BZ7	9AJ	
B	RF Amplifier	6BQ7	6BQ7	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	AGC Keying	6AU6	6AU6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	Audio Output	6BK5	6BK5	9BQ	
V11	Sync Amplifier-Noise Suppressor	12AT7	12AT7	9A	
V12	Sync Separator	6AU6	6AU6	7BK	
V13	Vert. Mult.	6SN7GT	6SN7GT	8BD	
V14	Vert. Output - Sync Control	12BH7	12BH7	9A	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	12AU7	12AU7	9A	
V17A	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
B	Horiz. Output	6AU5GT	6AU5GT	6CK	
V18	Damper	6W4GT	6W4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	LV Rectifier	5U4G	5U4G	5T	Two rectifiers used in Ch. V-2217-4, -5 only

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V22A	21FP4A	21FP4A	12C	Used in Ch. V-2217-4, -5
B	17LP4	17LP4	12C	Used in Ch. V-2216-4, -5
		21FP4 ①	12C	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	V-9891	E4D320		DO92		FP428.4	TVL-4720	
B	■40	450								
C	30	350								
D	▲30	350								
C2A	▲30	450	V-10306-1	AFH4-87		C104		FP385 TC39	TVL-3753	
B	▲150	50								
C	■10	450								
C3	10	450	V-10293-1	PRS500/10		BR1045A		TC72	TVA-1705	
C4A	30	450	V-10786-1	PRS450/30		BR3045A		TC77	TVA-1711	Red
B	10	450		PRS450/10-10		BRD1145B		TCD72	TVA-2722	Blue
C	10	450								Green
C5	15			SII5	D6-150		GP1K-150	UC-5415	5GA-Q15	
C6	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C7	3									
C8	1000									
C9	470			SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C10	1.2			SII.2NP0	TCZ-1.2		NP0K-1R2			
C11	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C12	3.3			SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	
C13	3.6									
C14	1.6									
C15	15			SII5	D6-150		GP1K-150	UC-5415	5GA-Q15	
C16	.75									
C17	15									
C18	10									
C19	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C20	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C21	1.5			SII.5NP0	TCZ-1.5		NP0K-1R5	ZT-5415	5TCCB-V15	
C22	1.6									
C23	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C24	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C25	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C26	10			SII0	D6-100		GP1K-100	UC-541	5GA-Q1	
C27	150									
C28	7.5									
C29	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C30	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C31	22				TCZ-22		NP0K-220		5TCC-Q22	
C32	22				TCZ-22		NP0K-220		5TCC-Q22	
C33	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C34	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C35	3.3		V-9926-2	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	
C36	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C37	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C38	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C39	.5		V-5658-11							
C40	12		R3CC20SL120K	SII2	D6-120		GP1K-120	UC-5412	5GA-Q12	
C41	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C42	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C43	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C44	1		V-5658-1		TCZ-1		NP0K-010		5TCCB-V1	
C45	12		R3CC20SL120K	SII2	D6-120		GP1K-120	UC-5412	5GA-Q12	
C46	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C47	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C48	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C49	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C50	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C51	800		V-9863-1	BPD-0008	DD-801	TM5T8	801-001	DC-521	5HK-D1	
C52	3.3		V-9926-2	SI3.3NP0	TCZ-3.3		NP0K-3R3	ZT-5533	5TCCB-V33	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
			REPLACEMENT DATA							
C53	12		R3CC208L130K	811Z	D6-120		GP1K-120	UC-5413	5GA-QU3	
C54	5		V-9926-3	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C55	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C56	470	500	RCM20B471K	1468-0005	D6-471	5W5T5	GP2K-471	MC245	1FM-35	
C57	12		V-5658-12	SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C58	56	500	RCM20B560K							
C59	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C60	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C61	.5	200	RCP10W2504M	P288-5		PJ2P5		PT405	2TM-P5	
C62	5		V-9926-3	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C63	150	500	RCM20B151K	1469-00015		SR5T15		MCB236		
C64	.002	600	RCP10W6202M	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C65	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C66	47	500	RCM20B470K	1469-00005		SR5Q5		MCB225	MS-45	
C67	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C68	47	500	RCM20B470K	1469-00005		SR5Q5		MCB225	MS-45	
C69	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C70	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C71	.002	600	RCP10W4202M	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C72	.022	400	RCP10W4203M	P488-022	DF-203	PTE4S22		PT422	4TM-S22	
C73	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C74	.005	600	RCP10W6502M	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C75	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C76	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C77	270	500	RCM20B271K	1468-0003	D6-271	5W5T3	GP2K-271	MC241	1FM-33	
C78	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C79	270	500	RCM20B271K	1468-0003	D6-271	5W5T3	GP2K-271	MC241	1FM-33	
C80	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C81A	.01			P688-01		PTE6S1	GP2-333-103	PT611	6TM-S1	
B	.002			P688-002		PTE6D2	GP2-333-202	PT622	6TM-D2	
C	.005		♦V-11192-1	P688-005	♦PC-101	PTE6D5	GP2-333-502	PT625	6TM-D5	
D	.005			P688-005		PTE6D5	GP2-333-502	PT625	6TM-D5	
C82	.01	400	RCP10W4103K	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C83	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C84	.05	400	RCP10W4503M	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C85	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C86	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C87	100	500	RCM20B101K	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C88	100	500	RCM20B101K	1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C89	680	500	RCM20B681K	1479-0007	D6-681	5R5T7	GP2K-681	UC-5368	1FM-37	
C90	330	500	RCM20B331K	1469-00035						
C91	.01	400	RCP10W4103M	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C92	.005	400	RCP10W4502M	P488-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C93	.01	400	RCP10W4103M	P 488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C94	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C95	100	500	RCM20B101K	1469-0001		SR5T1		MCB235	MS-31	
C96	3900	500	RCM30C392K	1464-004		IDR5D4		MCB463	MS-24	
C97	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C98	100	500	RCM20B101K	1469-0001		SR5T1		MCB235	MS-31	
C99	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C100	820	500	RCM30C821K							
C101	.01	600	RCP10M6103M	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C102	.1	600	RCP10M6104M	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C103	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	
C104	.1	400	RCP10W4104M	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C105	.06	600	RCP10M6603M	P688-06		PTE6S6		PT616	6TM-S6	
C106	.06	600	RCP10M6603M	P688-06		PTE6S6		PT616	6TM-S6	
C107	500	20000	V-9901-3	HV20C	TV3-502	MM-C20T5	413-501		20DK-T5	
C108	25	400	RCP10W4254M	P488-25		PTE4P25		PT4025	4TM-P25	
C109	33		V-9792-10530K							Note 1
C110	.01	600	V-5040-15	689ZX-01		PJ6S1		PT611	6TM-S1	
C111	.01	600	V-5040-15	689ZX-01		PJ6S1		PT611	6TM-S1	
C112	5000		V-5596	BPD-005	DD-502	TM5D5	811-005	DC-525	5HK-D5	

Note 1. 33MMF used with yoke part #V-10538-7.
56MMF (part #V-9792-10560K) used with yoke part #V-10538-6.
♦ Items C81A, C81B, C81C, C81D, R76A, R76B, R76C, R76D are combined in one unit.

CONTROLS

ITEM No	RATING RESIST-ANCE	RATING WATTS	Westinghouse PART No	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
			REPLACEMENT DATA					
R1A	1500Ω	½	V-9877-4	QJ-382 *	RTV-288	SBBT-704-S	UF152L	Contrast-Panel
B	500KΩ	½					UR55-T54 †	Volume-Tap ② 50KΩ-Rear
C	Switch						US-26	Attach to R1B
R2A	125KΩ	½	V-10915-1	Q11-228	AG-52-S	AB-40	U-415	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	50KΩ	½	V-10914-1	Q11-123	AG-44-S	AB-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	2 Meg	½	V-9894-2	Q11-139	AG-83-S	AB-75	SU-56	Focus
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R4A
R5A	250KΩ	½	V-9813-4	Q11-130	AG-55-S	AB-50	SU-46	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	750KΩ	½	V-9894-3	Q11-136	AG-61-S	AB-69	SU-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-1	Not Req.	Attach to R6A
R7A	5000Ω	½	V-6463	Q11-114	AG-19-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	500Ω	1	V-11345-2					Quieting-Wire Wound

* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS B17-109 & P1-212 (Panel) B18-133X & R2-226 (Rear) & SWITCH 76-1.
† UNIVERSAL REPLACEMENT (MALLORY EXACT DUPLICATE PART NO. UE181S).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R9	4700Ω	½		BTS-4700	
R10	1 Meg	½			
R11	750KΩ	½			
R12	220KΩ	½			
R13	2200Ω	½		BTS-2200	
R14	2200Ω	½		BTS-2200	
R15	15KΩ	½		BTS-15K	
R16	220Ω	½		BTS-220	
R17	470Ω	½		BTS-470	
R18	3900Ω	½		BTS-3900	
R19	1000Ω	½		BTS-1000	
R20	4700Ω	½		BTS-4700	
R21	1000Ω	½		BTS-1000	
R22	150Ω	½	RC20AE151K	BTS-150	
R23	1.2Meg	½	RC20AE125K	BTS-1.2Meg	Note 1
R24	4.7Meg	½	RC20AE475K	BTS-4.7Meg	
R25	68KΩ	½	RC20AE683K	BTS-68K	
R26	100	½	RC20AE100K		
R27	10KΩ	½	V-9927-10		
R28	47Ω	½	RC20AE470K		
R29	47Ω	½	RC20AE470K		
R30	2700Ω	½	RC20AE272K	BTS-2700	
R31	33KΩ	½	RC20AE333K	BTS-33K	
R32	10KΩ	½	RC20AE103M	BTS-10K	
R33	4700Ω	½	V-9927-2	BTS-4700	
R34	4.7Ω	½	RC20AE470K		
R35	100Ω	½	RC20AE101K	BTS-100	
R36	470Ω	½	RC20AE471M	BTS-470	
R37	4700Ω	½	V-9927-2	BTS-4700	
R38	150Ω	½	RC20AE151K	BTS-150	
R39	470Ω	½	RC20AE471M	BTS-470	
R40	220Ω	½	RC20AE221K		
R41	120Ω	½	RC20AE123K	BTS-12K	
R42	3300Ω	½	RC20AE332K	BTS-3300	
R43	68KΩ	1	RC30AE683K	BTA-68K	
R44	22KΩ	½	RC20AE223K	BTS-22K	
R45	220KΩ	2	RC20AE224K	BTS-220K	
R46	8200Ω	2	RC40AE822K	BTB-8200	
R47	8200Ω	2	RC40AE822K	BTB-8200	
R48	220KΩ	½	RC20AE224K	BTS-220K	
R49	470KΩ	½	RC20AE474K	BTS-470K	
R50	10KΩ	½	RC20AE123K	BTS-10K	Note 2
R51	68KΩ	½	RC30AE683K	BTA-68K	
R52	15KΩ	2	RC40AE153K	BTB-15K	
R53	4700Ω	1	RC30AE472K	BTA-4700	
R54	4700Ω	½	RC20AE472K	BTS-4700	
R55	120Ω	½	RC20AE121K	BTS-120	
R56	1200Ω	½	RC20AE122K	BTS-1200	
R57	27KΩ	2	RC40AE273K	BTB-27K	Note 5
R58	470Ω	½	RC20AE471M	BTS-470	
R59	330KΩ	½	RC20AE334K	BTS-330K	
R60	10KΩ	½	RC20AE103M	BTS-10K	
R61	150Ω	½	RC20AE151M	BTS-150	
R62	2500Ω	5	V-11328-7	1 3/4A-2500	
R63	270KΩ	½	RC20AE274K	BTS-270K	
R64	220KΩ	½	RC20AE224K	BTS-220K	

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R65	2200Ω	½	RC20AE222K	BTS-2200	
R66	4700Ω	½	RC20AE472K	BTS-4700	
R67	1800Ω	½	RC20AE182K	BTS-1800	Note 3
R68	680KΩ	½	RC20AE684K	BTS-680K	
R69	470KΩ	½	RC20AE474K	BTS-470K	
R70	2.2Meg	½	RC20AE225M	BTS-2.2Meg	
R71	390KΩ	½	RC20AE394K	BTS-390K	
R72	47KΩ	½	RC20AE473K	BTS-47K	
R73	220KΩ	½	RC20AE224K	BTS-220K	
R74	27KΩ	½	RC20AE273K	BTS-27K	
R75	6800Ω	½	RC20AE334K	BTS-6800	
R76A	22KΩ	½		BTS-22K	
B	22KΩ	½		BTS-22K	
C	8200Ω	½	♦V-11192-1	BTS-8200	
D	8200Ω	½		BTS-8200	
R77	100KΩ	1	RC30AE104K	BTA-100K	
R78	1200Ω	½	RC20AE122K	BTS-1200	
R79	560KΩ	½	RC20AE564K	BTS-560K	
R80	100KΩ	½	RC20AE104K	BTS-100K	
R81	39KΩ	½	RC20AE393K	BTS-39K	
R82	100KΩ	½	RC20AE104K	BTS-100K	
R83	6800Ω	½	RC20AE682K	BTS-6800	
R84	3300Ω	½	RC20AE332K	BTS-3300	
R85	2.2Meg	½	RC20AE225K	BTS-2.2Meg	
R86	470Ω	1	RC30AE471K	BTS-470	
R87	10KΩ	5	V-11328-2	1 3/4A-10K	
R88	560Ω	½	RC20AE561K	BTS-560	
R89	560Ω	½	RC20AE561K	BTS-560	
R90	1 Meg	½	RC20AE105K	BTS-1 Meg	
R91	1 Meg	½	RC20AE105K	BTS-1 Meg	
R92	220KΩ	½	RC20AE224K	BTS-220K	
R93	470KΩ	½	RC20AE474 M	BTS-470K	
R94	47KΩ	½	RC20AE473K	BTS-47K	
R95	820Ω	½	RC20AE821K	BTS-820	
R96	27KΩ	½	RC20AE273K	BTS-27K	
R97	300KΩ-5%	½	RC20AE304J	BTS-300K-5%	
R98	270KΩ	½	RC20AE274K	BTS-270K	Note 4
R99	22KΩ	½	RC20AE223K	BTS-22K	
R100	56KΩ	1	RC30AE563K	BTA-56K	
R101	150KΩ	1	RC30AE154K	BTA-150K	
R102	150KΩ	1	RC30AE154K	BTA-150K	
R103	12KΩ	½	RC20AE123K	BTS-12K	
R104	150Ω	½	RC20AE151K		
R105	470KΩ	½	RC20AE474K	BTS-470K	
R106	33Ω	1	RC30AE330K	BW-1-33	
R107	12KΩ	10	V-11328-1	1 3/4A-12K	
R108	56KΩ	1	RC30AE563K	BTA-56K	Note 8
R109	33KΩ	½	RC20AE333K	BTS-33K	
R110	10KΩ	½	RC20AE103K	BTS-10K	
R111	330KΩ	1	V-9927-7		
R112	39KΩ	2	RC40AE393K	BTB-39K	
R113	10KΩ	2	RC40AE103K	BTB-10K	Note 7
R114	18KΩ	2	RC40AE183K	BTB-18K	Note 8
R115	4000Ω	20	V-9375-3	2D-4000	
R116	50Ω	10			Note 6
R117	220KΩ	1	RC30AE224M	BTA-220K	

Note 1. Some models may use a 1.5Meg resistor in this application.
Note 2. Some models may use a 12KΩ resistor in this application.
Note 3. Some models may use a 2200Ω resistor in this application.
Note 4. Some models may use a 220KΩ resistor in this application.
Note 5. Early production models may use a 4700Ω resistor in this application.
Note 6. Used only in chassis No. V-2216-5.
Note 7. Chassis No. V-2216-5 uses a 6800Ω (2 Watt) resistor in this application.
Note 8. Not used in chassis No. V-2216-5.
♦ Items R76A, R76B, R76C, R76D, C81A, C81B, C81C, C81D are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.
					REPLACEMENT DATA					
T1	117VAC ③ 2.12A	652VCT ③ .230ADC	5VAC ③ 3A	12VCT ③ 6.25A	V-9958-2 V-9958-1 ①	P-8169 ②	P-3066 ③	TP-324	R-50BC	

① Used in Ch. V-2216-4 and V-2216-5.
② Add high voltage dropping resistor.
③ Tape ends on extra 5 V. and high voltage windings.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
			REPLACEMENT DATA						
T2	560Ω tap ④ 30Ω	13.5Ω tap ④ 1Ω, 9.5Ω SEC. 2 0Ω	V-10214	A-8130 ① ②	HVO-10	TFB-12 ③ ④	D-14 ⑤		Horiz. Output Trans.
T3	1600Ω		V-10909-1	A-8141	A-3039	TSO-12	A-104X	226T1	Vert. Output Trans.
T4A	15Ω		V-10911-4 ⑥	DY-9A	MDF-70	TY-5	Y-21	206D1	Horiz. Deflection Coils
B	55Ω		V-10911-3 ⑦ ⑧						Vert. Deflection Coils
T5	20Ω		V-9960	WC-5 ⑨	MWC-1 ⑨	TWL-1	WC-11	212R1	Horiz. Lin. Coil
T6	1Ω	95Ω	V-9902				WC-11		Width & AGC Coil

① Use with width coil WC-5.
② See instruction sheet (schematic 3 and 5A) packed with unit for terminal connections.
③ Drill new mounting holes.
④ Use with width coil TW-3.
⑤ Use with width coil WC-11.
⑥ Contains yoke V-10538-7.
⑦ Alternate deflection yoke.
⑧ Contains yoke V-10538-6.
⑨ Enlarge mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
					REPLACEMENT DATA					
T7	7.1KΩ	3.4Ω	502Ω	.75Ω	V-9238-1 V-9238 ①	A-3878	A-2931	RO-301	S-7X	

① Used in Model 723K21.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	Westinghouse PART No.	VIKING PART No.	QUAM PART No.	NOTES
				REPLACEMENT DATA			
SP1	10"	PM	3.4Ω	V-9770-1	10J11	10A4A	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	Westinghouse PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
				REPLACEMENT DATA				
L1	.200ADC	40Ω	1.24Ω	V-6471-2	C-2326 ①	C-2991 ①	TR-1733 ①	C-23X

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	Westinghouse PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
				REPLACEMENT DATA				
L2	Ant. Trans.	0ΩCT	0Ω					Low Channel Secondary-0Ω
L3	Ant. Coils	0Ω						
L4	Ant. Shunt Coil	0Ω						
L5	UHF Ant. Coil	0Ω						
L6	UHF Ant. Coil	0Ω						
L7	Ant. Coil	0Ω						Channel 13
L8	Fil. Choke	0Ω						
L9	Neutr. Coil	0Ω						
L10	RF Coil	0Ω						Channel 13
L11	RF Coils	0Ω						
L12	Mixer Grid Coil	0Ω						Channel 13
L13	Mixer Grid Coils	0Ω						
L14	Osc. Plate Coil	0Ω CT						Channel 6
L15	Osc. Coil	0Ω						
L16	Osc. Coil	0Ω						
L17	Conv. Plate	.1Ω						
L18	1st. Video IF	0Ω		V-9882-7				
L19	Sound Trap	0Ω		V-10771-1				
L20	Fil. Choke	0Ω		V-4886-2	4602			1.1 Microhenries
L21	2nd. Video IF	.5Ω	.4Ω	V-9879				
L22	Adj. Channel Sound Trap	0Ω		V-10771-1				
L23	Fil. Choke	0Ω		V-4886-2	4602			1.1 Microhenries
L24	3rd. Video IF	.5Ω	.4Ω	V-9879				
L25	4th. Video IF	.5Ω	.4Ω	V-9880				
L26	Series Peaking Coil	1Ω		V-4886-1	4624			14 Microhenries
L27	Series Peaking Coil	7Ω		V-9915-1	6177	19-3093		100 Microhenries
L28	Shunt Peaking Coil	1Ω		V-4886-1	4624			14 Microhenries
L29	Fil. Choke	0Ω		V-4886-2	4602			1.1 Microhenries
L30	4.5MC Trap	1.8Ω		V-9882-3	1470	20-1004		
L31	Series Peaking Coil	5Ω		V-5902-1	4644	19-3160		140 Microhenries
L32	Shunt Peaking Coil	7Ω		V-5902-5	6181	19-3250		250 Microhenries
L33	Series Peaking Coil	1Ω		V-4886-1	4624			14 Microhenries
L34	1st. Sound IF	.3Ω		V-9882-5	1470	20-1005		
L35	2nd. Sound IF	1.1Ω		V-9882-2	1470	20-1005		
L36	RF Choke	9Ω		V-9915-2	4648	19-1923		350 Microhenries
L37	Quadrature Coil	5.5Ω		V-11396-1				
L38	Horiz. Osc.	75Ω		V-6704	6210	19-1575		
L39	RF Choke	2.2Ω		V-9099-5	4606		CLA	2.7 Microhenries
L40	RF Choke	2.2Ω		V-9099-5	4606		CLA	2.7 Microhenries
L41	RF Choke	0Ω		V-4886-2	4602			1.1 Microhenries

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
		REPLACEMENT DATA	
M1	RF Tuner	V-11333-1	
M2	Crystal Diode	V-10916-1	Video Detector (CK-706, 1N60, 1N64)
M3	Centering Magnet		Mounted on rear of yoke cover (Part of Yoke Assembly)
M4	Ion Trap	V-9784-4	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (CONT.)

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
B1	Trimmer Capacitor	V-11228-1	Horiz. Multivibrator, 5-40MMF
	Cabinet	V-1273-1	Model H-704T17
	Cabinet	V-1275-1	Model H-710T21
	Cabinet	V-1275-2	Model H-711T21
	Cabinet	V-1274-1	Models H-714K21 and H-754K21
	Cabinet	V-1274-2	Model H-715K21
	Cabinet	V-1272-1	Model H-720K21
	Cabinet	V-1272-2	Model H-721K21
	Cabinet	V-1271-3	Model H-723K21
	Back Cover Assy.	V-10928-3	Model H-704T17
	Back Cover Assy.	V-10962-4	Models H-710T21, H-711T21, H-714K21, H-715K21, H-720K21, H-721K21
	Back Cover Assy.	V-10962-8	Model H-723K21
	Back Cover Assy.	V-10962-15	Model H-754K21
	Safety Glass	V-11306-2	Model H-704T17
	Safety Glass	V-11288-1	Models H-710T21, H-711T21
	Safety Glass	V-11288-2	Model H-714K21
	Safety Glass	V-11291-1	Model H-715K21
	Safety Glass	V-11291-4	Models H-720K21, H-721K21
	Safety Glass	V-11291-6	Model H-723K21
	Safety Glass	V-11625-1	Model H-754K21
	Mask	V-10929-1	Models H-710T21, H-711T21, H-714K21, H-754K21
	Mask	V-10929-2	Models H-715K21, H-720K21, H-721K21, H-723K21
	Knob	V-9938-4	Off/On Volume, Models H-704T17, H-710T21, H-711T21, H-714K21, H-754K21
	Knob	V-9938-5	Off/On Volume, Models H-715K21, H-720K21, H-721K21, H-723K21
	Knob	V-9939-5	Picture, Models H-704T17, H-710T21, H-711T21, H-754K21
	Knob	V-9939-6	Picture, Models H-714K21, H-715K21, H-720K21, H-721K21, H-723K21
	Knob	V-11146-1	Channel Selector, Models H-704T17, H-710T21, H-711T21, H-714K21, H-754K21
	Knob	V-11146-2	Channel Selector, Models H-715K21, H-720K21, H-721K21, H-723K21
	Knob	V-9940-3	Fine Tuning, Models H-704T17, H-710T21, H-711T21, H-714K21, H-754K21
	Knob	V-9940-4	Fine Tuning, Models H-715K21, H-720K21, H-721K21, H-723K21
	Knob	V-10926-1	Horizontal Hold, Brightness
	Base	V-10924-2	Channel Selector, Models H-704T17, H-710T21, H-711T21, H-714K21, H-754K21
	Base	V-10924-3	Channel Selector, Models H-715K21, H-720K21, H-721K21, H-723K21

TROUBLE SHOOTING AIDS (CONT.)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check waveform at W17.

If Unsatisfactory	If Satisfactory
Check components of horizontal oscillator and coupling network between V16 and V17.	Check T2 and T4. Check high voltage filter components. Check damper circuit.

WEAK HIGH VOLTAGE

Substitute V16, V17, V18, V19, V20 and V21.
Follow procedure outlined under LOSS OF HIGH VOLTAGE.

BLOOMING

Substitute V16, V17, V18, V19, V20 and V21. Check associated components, particularly R111 for increase resistance.

POWER

SMALL RASTER, WEAK SOUND

Substitute V20 and V21. Check B+ circuit for shorts.

DIM PICTURE

Measure B+

If Low	If Normal
Check for shorts	Check V18 and other components of boost B+.

GENERAL

RASTER, BUT NO PICTURE, SOUND OR SNOW

Check by substitution V1, V2, V3, V4 and V5. Check associated components.

WEAK PICTURE AND WEAK SOUND

Check video IF tubes and components.

SNOW, BUT NO PICTURE OR SOUND

Check tuner tubes and components.
Check local oscillator setting.

SOUND, BUT NO PICTURE

Substitute V6 and check components.

INTERMITTANT STREAKS

Chech high voltage circuit for corona discharge and arcing.

TOTAL LOSS OF SYNC

Substitute V7 and check components.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiveing equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

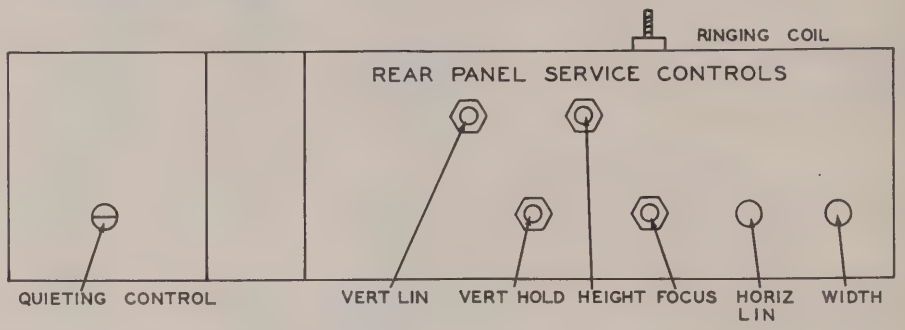
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructinns).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - QUIETING CONTROL

In weak signal areas adjust slightly for minimum noise. (Located on rear apron of IF sub-chassis).

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horiz. osc. should not be attempted in the field. For proper adjustment see Horiz. Sweep. Circuit adjustment page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

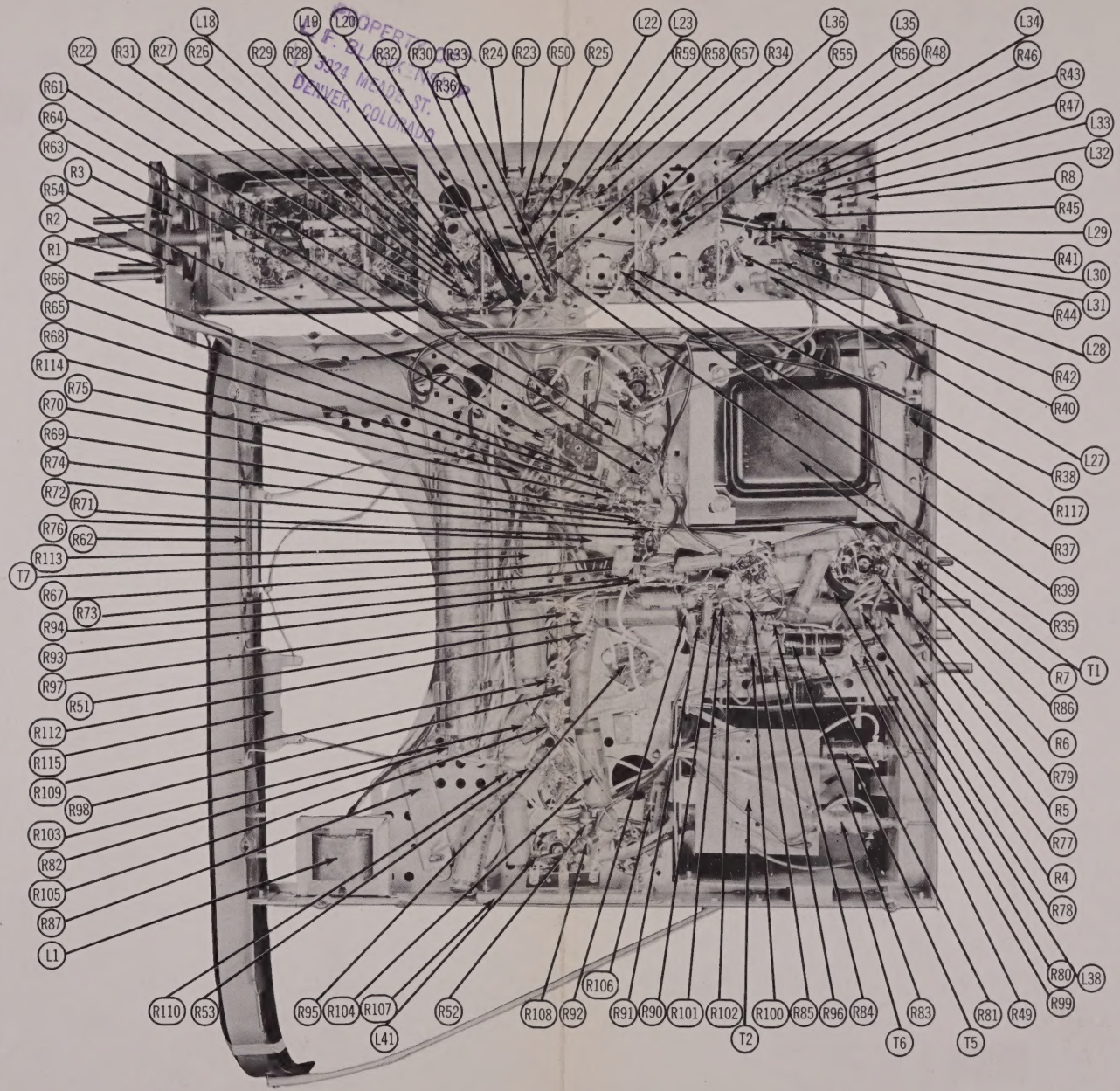
Gated beam detector adjustment should not be attempted in the field . For proper adjustment see alignment instructions pages 6 and 7.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push on type control knobs from front panel.
2. Disconnect built-in antenna & transmission line.
3. Remove 9 wood screws. Remove rear cover.
4. Disconnect speaker leads. Remove 4 speaker screws. Remove speaker.
5. Remove 6 chassis bolts. Remove chassis.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION